

RAYTOOLS

XCS3000S

Laser Cutting System Commissioning Manual



A CNC System

B Laser Delivery

C IOT



XC3000S Series Laser Cutting

System Commissioning Manual

Document History

Edit date	Version	Topic, revision, action taken
2023/5/26	V1.2	First edition

Thank you for choosing our product!

This manual describes the installation and commissioning of laser cutting head in details so that you can use this product quickly. You can consult us directly for more details.

Due to the continuous updating of product functions, the product you receive may differ from the introduction in this manual in some aspects.

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If you find any errors in this document, please inform us as soon as possible. The data contained in this manual is only used to describe the product and shall not be regarded as a statement of security interest.

For the benefit of our customers, we will constantly try to ensure that the products we develop comply with the latest technology.

Raytools AG

Email: sales@raytools.com Website: www.raytools.ch **XC3000S Series Laser Cutting**

System Commissioning Manual Disclaimer

• We reserve the right to change the design in order to improve the quality or expand the application or comply to manufacturing workmanship.

• We will not bear any responsibility for losses and accidents caused by wrong operation or improper handling of our products.

• Dismantling of product will lose all warranty claims excluding the normal replacement of worn parts and components required for maintenance or commissioning operations.

• Unauthorized modification of products or use of non-original spare parts will directly lead to the invalidation of warranty and liability exemption.

• It is recommended to only use the spare parts provided by us or submit them to us or the designated professional team for installation.

Use Regulations

- Ensure that the product is used in a dry environment.
- Ensure that the product is used in the environment required by EMC standards.
- The product is only allowed to run within the parameters specified in the technical data.

Personnel Responsibilities

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• Be familiar with the basic provisions of work safety & accident prevention and have received equipment operation guidance.

- Read and understand basic safety instructions and operations.
- You must have studied the relevant regulations and safety instructions and understand the possible hazards.
- Comply with relevant regulations and implement corresponding protective measures.



Safety Instructions

Prevent Electric Shock

• Parts of the laser head such as nozzle, sensor, sensor interface and attached fasteners may not be fully protected by the ground wire due to function fault. These parts may have low voltage. When installing electrical equipment, please pay attention to taking anti electric shock measures for relevant personnel.



Note that the equipment shall be grounded as specified.

Guard against Danger

- Never put your hands or other body under the laser head.
- Repair and maintenance work can only be carried out after the power is turned off.
- Do not exceed the specified maximum pressure.
- It must be ensured that the laser head is in normal condition at all times.
- All fasteners such as bolts and nuts must be tightened.



- Avoid direct laser radiation or scattering to the skin.
- Do not stare at the laser beam even when wearing optical equipment.
- Use special laser protective eyeglasses that meet the requirements of safety standards IEC 60825-1.

Prevent Waterway Corrosion

• In order to avoid corrosion, use the specified coolant and comply with relevant requirements and specified maintenance intervals.

Noise Prevention

• The corresponding measures shall be specified or explained and observed in order to prevent personnel from being harmed by noise when the cutting air pressure is high.

Storage and Transportation

- Observe the storage temperature range allowed by the technical data.
- Take reasonable measures to prevent fire, vibration or impact.

Do not store in or near the magnetic field.



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1 Product Overview

The manual includes the summarized instruction of installation, setting, use and operation of professional RAYTOOLS XC3000S Series laser cutting software. Main functions are introduced here as there are too many modules to describe.

XC3000S Series laser cutting software is a professional CNC software of RAYTOOLS, adapted to industrial laser production application. This software can work with popular laser cutting equipment in the market with its advantages covering rich functional modules, independent process database, along with human machine interface, which is smooth and convenient to operate for users.

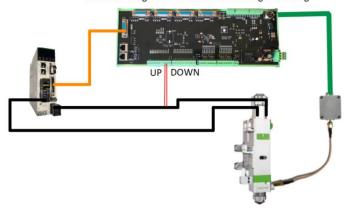


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1.2 System connection schematic

Bus type servo connection method 网络连接示意图 Schematic Diagram of EtherNET Connection 网线 LAN2 HMI (LAN2) EtherNET Cable EtherCAT(LAN1) Y Х Y1 Ζ EDS2010 EDS3000

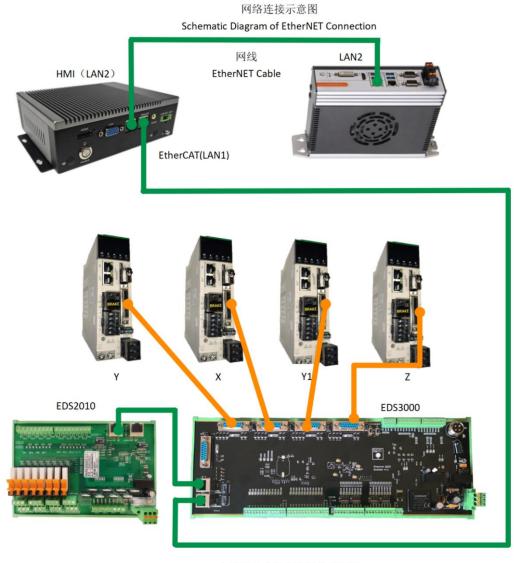
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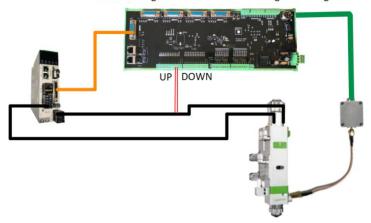
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Pulse type servo connection method



自动调焦及调高器接线示意图 Schematic Diagram of Auto-Focus and Height Tracking



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1.3 Technical parameters

		EtherCAT	Support stan	Support standard EtherCAT for flexible access to the system top		
Motion	Control Method	Pulse	types of serve	5-way universal interface of axis, which can be adapted to different types of servo drives and provide high-precision position feedback, supporting CiA402 standard		
Control			1-way F-axis ir	nterface d	edicated to laser head focus control	
		Control Period		1ms		
	Motion Performance	Acceleration and	deceleration	S-type		
	Periormance	Advanced-planne	ed speed with r	notor reve	ersing and intelligent lifting speed	
	24 ways of digital	inputs with flexible	e configuration	of high/le	ow side input	
	16 ways of 24V generic digital outputs					
	4 ways of 16-bit high-resolution AD inputs with a voltage range -10V ~ +10V					
IO Function	2 groups PWM outputs, supporting 24V and 5V PWM signals (adjusting by picks), Frequency range 0~30kHz with an accuracy of 1%					
	1 laser follow control interface, with external capacitance amplifier, to achieve EtherCAT-type high-precision capacitive height control					
	Temperature				0° C ~ +80° C	
Work Environment	Environmental pressure				0.096MPa ~ 0.106MPa	
	Relative humidity (non-condensing)				0 ~ 70%	
Power	EPC-2000				24V DC (9-36V wide voltage module)	
Requirement	EDS-3000				24V DC	

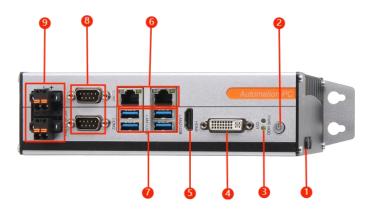
2 Wiring instructions

2.1 EPC-1020 interface description

EPC-1020 (optional) is our new HMI PC, with good performance in graphics processing and response speed.

EPC-1020	
Network Card	2× Gigabit NIC
USB	4 x USB3.0, 1 built-in USB2.0 onboard
Storage Device	1 x mSATA HDD card slot 1 x M.2(B Key, Type 2280)SSD Card slot, SATA signal
Ambient temperature	-20°C~60°C
Ambient humidity	5%~95% (non-condensing)
Display	Support both HDMI / DVI-D interface
Power supply	DC12~24V ±10%, Over-current, over-voltage and anti-reverse protection
Size	(L x W x H) 200mm x 154.5mm x 57.6mm

System Commissioning Manual 2.1.1 EPC-1020 interface description



1	Antenna interface
2	Startup button
3	Status light
4	DVI-D
5	HDMI
6	2×Gigabit NIC
7	4×USB
8	2xRS232/RS485
9	DC IN 12V~24V

>LAN2 connects with master control EPC-2000 for human machine interaction.

>24V (12V~24V) DC power supply input.

2.2 EPC-2000 interface description

EPC-2000 real-time EtherCAT master PC is the core component of motion control system of the machine, developed by Raytools technology with motion control algorithm and professional control logic designed for laser use. It also supports a variety of modes like online upgrade or real-time upgrade, with features

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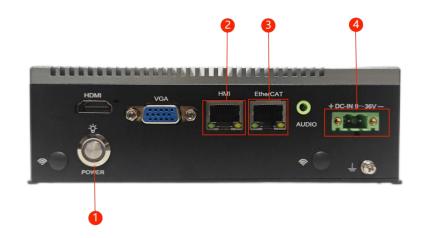
System Commissioning Manual

including good stability, anti-interference ability, high-performance computing mode, and easy to upgrade and operate.

EPC-2000	
Network Card	2×Gigabit NIC
USB	4×USB2.0, 2个USB3.0
Storage Device	1×2.5HD,1×MSATA
Ambient temperature	-20°C~60°C
Ambient humidity	5%~95%
Display	Support both HDMI / VGA interface
Power supply	9-36V wide voltage module
Size	(L x W x H) 181.7mm×126.5mm×54mm

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2.2.1 EPC2000 Interface Layout



1	Startup button
2	HMI (LAN2) master control module communication interface
3	EtherCAT (LAN1) connection interface
4	DC power input 9-36VDC

>EtherCAT (LAN1) port is defined as EtherCAT connection interface to be connected with the servo motor and EDS board.

>HMI (LAN2) port is defined as the connection to the IPC / EPC-1010.

>Please input 24V (9-36V wide voltage) DC power.

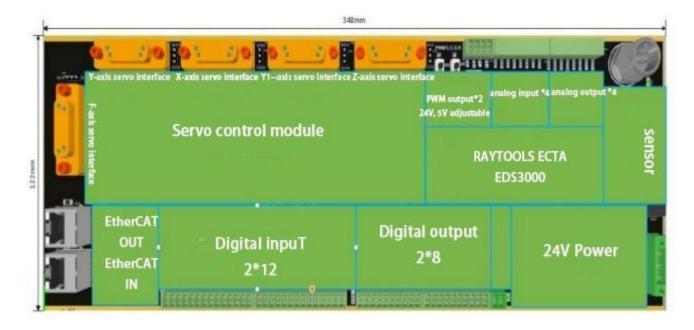
2.3 EDS3000 Interface Description

EDS3000 is an EtherCAT-based slave interface board with a rich set of IO, motion control and laser follow interfaces and resources, especially for signal acquisition and motion control applications in the laser industry.

EDS3000						
Module	Qua.	Description	Remark			
Power supply	/	24V DC	Voltage range (18~36V)			
PWM 2		5V、24V; Duty cycle: 0%-100%; Fre.: 20kHz	; Duty cycle: 0%-100%; Fre.: 20kHz			
DA 4		putput: 0~+10V; 16bit; Accuracy: 10mV				
AD	4	Input: 0~+10V; 16bit; Accuracy: 10mV				
Digital input	24	24V/0V (variable), COM port wiring control				
Digital output	16	Single output high level 24V DC				
Ambient environment		Temperature : 0~+55 ℃ ; Ambient humidity (non-condensing) : 5%~95%				
Size		129.36*350.5				

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2.3.1 EDS3000 Interface Description



The board has a boundary dimension of 122mm*348mm and can be assembled on a module rack for mounting on the DIN C45 rail.

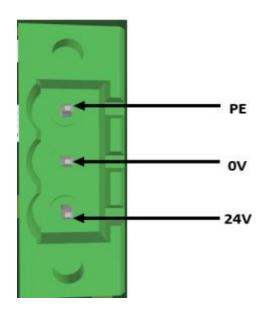
On the upper left there are 4 DB15 ports for external servo drives. From left to right, they are Y-axis, X-axis, Y1-axis and Z-axis. At the lower left, there is one F-axis interface and two RJ45 ports for external F-axis servo drive and EtherCAT cables.

The upper right ports are 2 PWM output ports, 4 analog input ports, 4 analog output ports and 1 laser head height sensor port respectively. The lower right port is a 24V power input port with 2 PWMs which can work with 24V or 5V output.

From left to right on the lower part, there are 12 dedicated digital inputs, 12 generic digital inputs, 16 generic digital outputs, and 1 brake output connector.



System Commissioning Manual 2.3.2 Power supply interface description

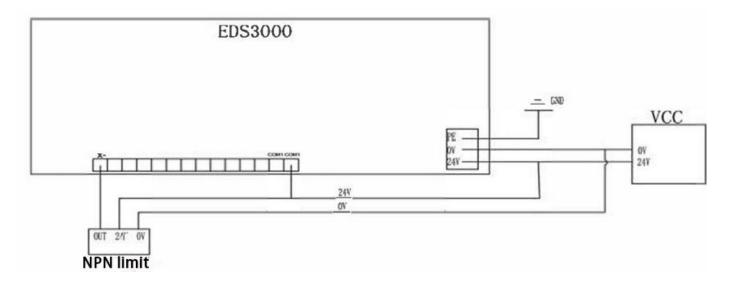


EDS3000 board power interface needs to be externally connected to the DC24V switching power supply, where the 24V, 0V and PE input terminals are connected to the output interface 24V, 0V and PE of external switching power supply respectively.

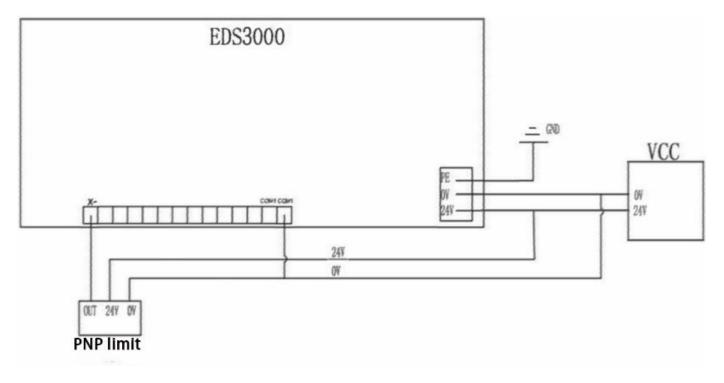
2.3.3 Digital input interface

When COM1 is connected to 24V, the input signal is active low; when COM1 is connected to 0V, the input signal is active high. Take NPN and PNP sensors as an example:

When using the NPN type limit, the COM1 port is connected to 24V.



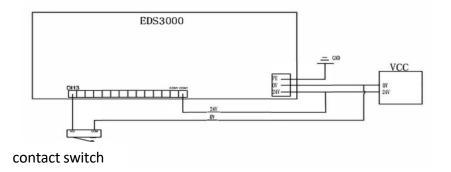
When using PNP type limits, the COM1 port is connected to 0V.



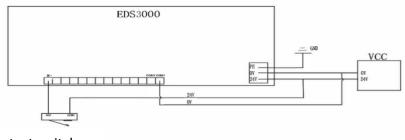


When COM1 is connected to 24V, the input signal is active low; when COM1 is connected to 0V, the input signal is active high. Take contact switch as an example.

Active low-evel connection



Active high-evel connection



contact switch

2.3.4 Digital output interface

DO1-DO16 are 16-way digital output interfaces (24V output), which can be configured as "oxygen valve", "laser enable", "focus enable", "indicator" and other related control interfaces. The definition of each port is preset in the software, as shown below:

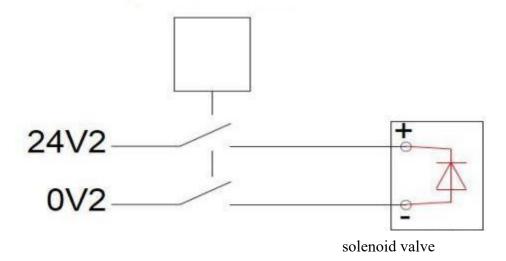
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All DO1~DO16 output 24V high level, with the maximum output current of 0.5A. If it's connected to a high- power load, please connect an external relay and connect a current- continuing diode (MIC 10A6) in parallel with the oxygen and nitrogen solenoid valve.

In addition, it is better to use another power supply DC24V2 control valve, which can be separated from the system IO power supply DC24V1.

Take the shown below as an example:

Intermediate relay

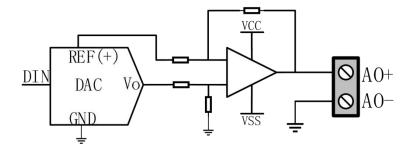


2.3.5 Analog input interface

A total of 4 A/I analog input interfaces are provided, with a signal input range $0V \sim 10V$.

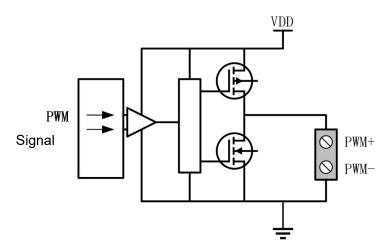
2.3.6 Analog input interface

A total of 4 A/O analog output interfaces are provided, with a signal output range $0V \sim 10V$. The way is as shown in the figure.



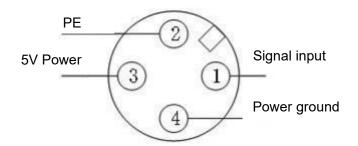
2.3.7 **PWM Interface**

There are 2 PWM pulse width modulation signals, which can be used to control the average power of the fiber laser. The PWM signal supports 24V or 5V (manually adjusting), and the duty cycle is adjustable from 0% to 100%.



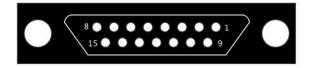
2.3.8 Sensor Interface

There is a sensor interface circuit for laser head height adjustment. The output signal from the receiving capacitor amplifier circuit is fed to the CPU through the conditioning circuit, and the interface is defined as follows:



2.4 Servo Drive Interface

1. 5 servo control interfaces on the board card to connect the generic axis (X, Y, Y1, Z and F axes) interface use a double-row DB15 female socket, as shown in the following figure:



The pins are defined as follows:

	Servo interface signal description								
Foot	Signal	Function	Foot	Signal	Function				
No.	Name		No.	Name					
3	A+	A-phase encoder pulse	2	XD+	Axis rotation direction				
		input +			switching output +				
11	A-	A-phase encoder pulse	10	XD-	Axis rotation direction				
	A-	input -			switching output -				
4		B-phase encoder pulse	14	ALM	Servo alarm input				
	B+	input +							
12		B-phase encoder pulse	6	SON	Servo enable output				
	В-	input -							
5	-	Z-phase encoder pulse	7	CLR	Axis Clear Output				
	Z+	input +							
13	Z-	Z-phase encoder pulse	8	P24V	24V power supply				
		input -							
1	VD.	Axis speed control	15	PGND	Power Ground				
	XP+	output +							
9	XP-	Axis speed control							
3		output -							

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Note: EDS3000 board ALM signals are active low, which can be switched to active high by the jumper cap next to the corresponding axis port. The alarm polarity of the axis port can also be set in the configuration



tool to change the alarm trigger conditions. LOW

2. Servo drive control signal wiring diagram

Note: The following should be noted when connecting the servo drive:

EDS3000 uses a pulse + direction signal to control the servo drive, and it must be confirmed that the drive

supports this mode; and whether the type of servo drive enable signal (SON) selected is active low;

Confirm the servo drive parameters are set correctly. If the servo cannot run, the parameters should be set to not use the "forward and reverse input prohibition";

2.4.1 Yaskawa Servo Drive Wiring Diagram

Servo control interface EDS3000-DB15 2-pin (male)				shielded wire	Yaskawa	a serv	o 50 Pin interfac
Signal	Pin	Line			1	Pin	Signal
A+	3	purple				33	PAO
A-	11	yellow				34	/PAO
B+	4	yellow & black				35	PBO
B-	12	blue	11			36	/PB0
Z+	5	blue & black	11		<u> </u>	19	PCO
Z-	13	black & white	11		-	20	/PC0
XP+	1	red & black	44			7	PULSE
XP-	9	green	++			8	/PULSE
XD+	2	green & blac k	+ +			11	SIGN
XD-	10	brown	1			12	/SIGN
ALM	14	orange	++			31	ALM+
SON	6	orange &black				40	/S-ON
CLR	7	red & black	1 1			44	/ALM-RST
P24V	8	black				47	+24VIN
PGND	15	black & brown	11			1	SG
			12-			32	ALM-



Yaskawa Servo Parameter Setting				
Parameter Type	Recommended Value	Setting range		
Pn000	0.0.1.0	0.0.x.0 (0 speed; 1 position) 0.0.0.X (0 forward; 1 reverse)		
Pn000	0.1.0.1	0.X.0.0 (0 3-phase power; 1 single-phase power); 0.0.0.X (0 display setting, 1 display all parameters)		
Pn200	0.0.0.0	0.0.0.X (0pulses +direction positive logic, 5 pulses +direction negative logic) . X.0.0.0 (linear 1M)		
Pn50A	8100	Positive turn prohibition cancellation		
Pn50B	6548	Reverse prohibition cancellation		

2.4.2 HCFA Servo Drive Wiring Diagram

15 2-pin (male)			shielded	wire	HCFA serv	
Signal	Pin	Line	/	7	Line	Signal
A+	3	purple	TX	11	36	OUTA
A-	11	yellow	11	11	37	/OUTA
B+	4	yellow&black	11	1 1	38	OUTB
B-	12	blue	1 1	1 1	39	/OUTB
Z+	5	blue&black	+ +		40	OUTZ
Z-	13	black&white			41	/OUTZ
XP+	1	red&black		i	26	CMD PLS
XP-	9	green			27	/CMD PLS
XD+	2	green&black			30	CMD DIR
XD-	10	brown			31	/CMD DIR
ALM	14	orange	1		21	S ERR+
SON	6	orange&black			4	S ON
CLR	7	red&black	11		5	ERR-RST
P24V	8	black	11	11	3	COM+
PGND	15	brown&black	ii	11	12	COM-
			<u> </u>		22	S ERR-

	HCFA Ser	rvo Parameter Setting
Parameter	Recommended	Setting Range
Туре	Value	
P00-01	0	0 Position mode; 1 Speed mode; 7 EtherCAT mode
P00-07	0	0: Pulse + direction positive logic; 1 Pulse - direction negative logic
P00-16	1	0: forward; 1: reverse

2.4.3 Panasonic Servo Drive Wiring Diagram

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Servo control interface

EDS3000-DB15 2-pin (male)

shielded wire

Panasonic servo 50 Pin interface

			shielded wi	le	<u> </u>
Signal	Pin	Line	<u>~</u>	Pin	Signal
A+	3	purple	1	21	0A+
A-	11	yellow	11	22	OA-
B+	4	yellow&black		48	0B+
B-	12	blue	11	49	OB-
Z+	5	blue&black	11	23	0Z+
Z-	13	black&white	11	24	0Z-
XP+	1	red&black		44	PULSH1
XP-	9	green	<u> </u>	45	PULSH2
XD+	2	green&black		46	SIGNH1
XD-	10	brown		47	SIGNH2
ALM	14	orange	++	37	ALM+
SON	6	orange&black	1	29	SRV-ON
CLR	7	red&black	+ +	31	A-CLR
P24V	8	black	11	7	COM+
PGND	15	brown&black		41	COM-
			·/		ALM-

Panasonic Servo Setting Parameters					
Parameter Type	Recommended Value	Setting Range			
Pr001	0	0: Position control, 1: Speed control			
Pr007	3	3: Pulse plus direction			
Pr005	1	1: High-speed pulse 3mpa; 0: Low- speed pulse 500kpps			

2.4.4 Delta Servo Drive Wiring Diagram

3000-DB	15 2-pi	n (male)	shielded wire	Delta serv	/o 44 Pin inter
ignal	Pin	Line		Pin	Signal
A+	3	purple		21	OA
A-	11	yellow		22	/OA
B+	4	yellow&black	<u>.</u>	25	OB
B-	12	blue		23	/0B
Z+	5	blue&black	1	13	OZ
Z-	13	black&white	1	24	/OZ
XP+	1	red&black	-	38	HPULSE
XP-	9	green	+ +	36	/HPULSE
XD+	2	green&black	+ +	42	HSIGN
XD-	10	brown	1	40	/HSIGN
ALM	14	orange	+ +	28	ALRM+
SON	6	orange&black	i +	9	SON
CLR	7	red&black	+	33	ARST
P24V	8	black	·	11	COM+
PGND	15	brown&black		14	COM-
		1	/	27	ALRM-

Delta B Series Servo Drive Wiring Diagram

Servo control interface

8000-DB15 2-pin (male)		(male)	shielded wire	Delta servo	50 Pin inte
Signal	Pin	Line	~	Pin	Signal
A+	3	purple	1	21	OA
A-	11	yellow	1	22	/0A
B+	4	yellow&black		25	OB
B-	12	blue		23	/0B
Z+	5	blue&black	1	50	OZ
Z-	13	black&white		24	/0Z
XP+	1	red&black		38	HPULSE
XP-	9	green		29	/HPULSE
XD+	2	green&black		46	HSIGN
XD-	10	brown	1	40	/HSIGN
ALM	14	orange		28	005+ ALRM
SON	6	orange&black	1	9	DI1 SON
CLR	7	red&black	1	33	DI5 ARST
P24V	8	black	1	11	COM+
PGND	15	brown&black		45	COM-
				27	D05-

Delta A2 Series Servo Drive Wiring Diagram

	Delta Servo Setting Parameters						
Parameter Type	Recommended Value	Setting Range					
P1-00	0x1002	Thousands of bits 1 High-speed differential					
P1-01	0x0000	Percentile 1 is the reverse					
P2-10	0x0101	DI1					

Fuji servo 26 Pin interface

2.4.5 Fuji Servo Drive Wiring Diagram

Servo control interface

Signal	Pin Line	Pin	Signa
A+	3 purple	9	FFA
A-	11 yellow	10	*FFA
B+	4 yellow&black	11	FFB
B-	12 blue	12	*FFB
Z+	5 blue&black	23	FFZ
Z-	13 black&white	24	*FFZ
	1 I	1.1.	
XP+	1 red&black	7	CA
XP-	9 green	8	*CA
XD+	2 green&black	20	CB
XD-	10 brown	21	*CB
	i i	1	
ALM	14 orange	17	OUT3
SON	6 orange&blacк	2	CONT1
CLR	7 red&black	3	CONT2
P24V	8 black	1	COMIN
PGND	15 brown&black	14	COMOUT

EDS3000-DB15 2-pin (male)

Fuji servo 26 Pin interface

XC3000S Series Laser Cutting

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	Fuji Servo Setting Parameters					
Parameter Type	Recommended Value	Setting Range				
PA-101		<pre>0position 1speed 2torque 3position <=> speed 4position <=>Torque 5Speed <=> Torque 6Extended mode 7Positioning operation</pre>				
PA-103		0Differential input: Command pulse/symbol 1Differential input: Forward pulse/reverse pulse 2Differential input : 90° bit phase difference 2 signal 10Open collector input : Command pulse/symbol 11Collector Open-collector input: Forward pulse/ reverse pulse 12open collector input :90° bit phase difference 2 signal				

2.4.6 LEAD-Motion Servo Drive Wiring Diagram

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Servo control interface

shielded wire

LEAD servo P series interface

Signal	Pin	Line	~	• Pin	Signal
A+	3	purple	1	1	PAO
A-	11	yellow		2	/PAO
B+	4	yellow&black		3	PBO
B-	12	blue		4	/PB0
Z+	5	blue&black		5	PCO
Z-	13	black&white		6	/PCO
XP+	1	red&black		8	PULSE
XP-	9	green		9	/PULSE
XD+	2	green&black	-	12	SIGN
XD-	10	brown		13	/SIGN
ALM	14	orange		DOO	ALM+
SON	6	orange&black	H +	DIO	/S-ON
CLR	7	red&black	H 1	DI1	/ALM-RS
P24V	8	black		ICOM	+24VIN
PGND	15	brown&black		OCOM	SG
			Y		ALM-

P Series Servo Drive Wiring Diagram

LEAD servo M series interface

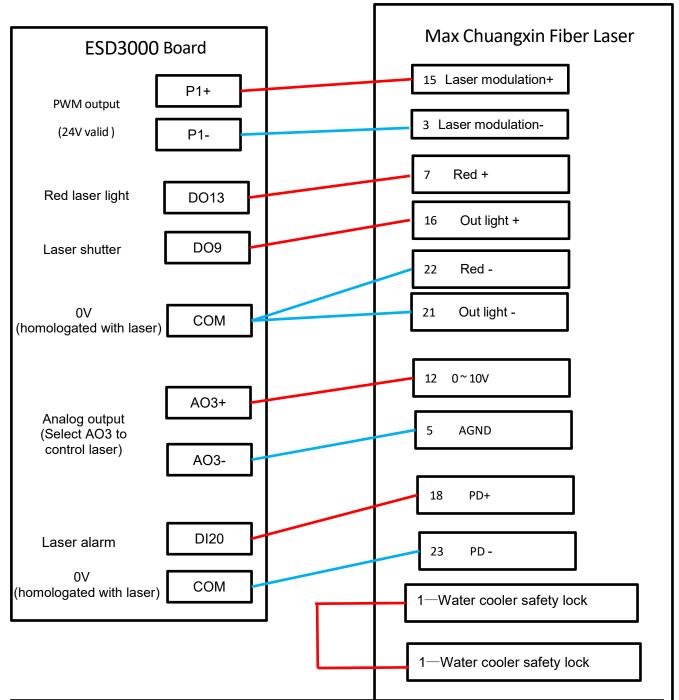
Servo control interface

EDS3000-DB15 2-pin (male) shielded wire Signal 1 Pin Pin Line Signal purple 21 PAO A+ 3 L I . A-11 yellow 22 /PAO L 1 ÷ 1 PB0 B+ 4 yellow&black 25L I 1 1 12 /PBO Bblue 23 l 1 Z+ 5 PC0 blue&black 13 black&white Z-13 /PCO 24 I I I XP+ PULSE 1 41 red&black I XP-9 green /PULSE 43 I green&black XD+ 2 37 SIGN I I I. I XD-10 39 /SIGN brown I I L I I I ALM 14 1 ALM+ orange SON 6 33 /S-ON orange&black 7 CLR red&black 8 ALM-RST P24V 8 11 COM+ black ۱ brown&black PGND 15 COM-14 11 11 26 ALM-

M Series Servo Drive Wiring Diagram

2.5 Laser Wiring

2.5.1 Max Chuangxin Fiber Laser Wiring Diagram

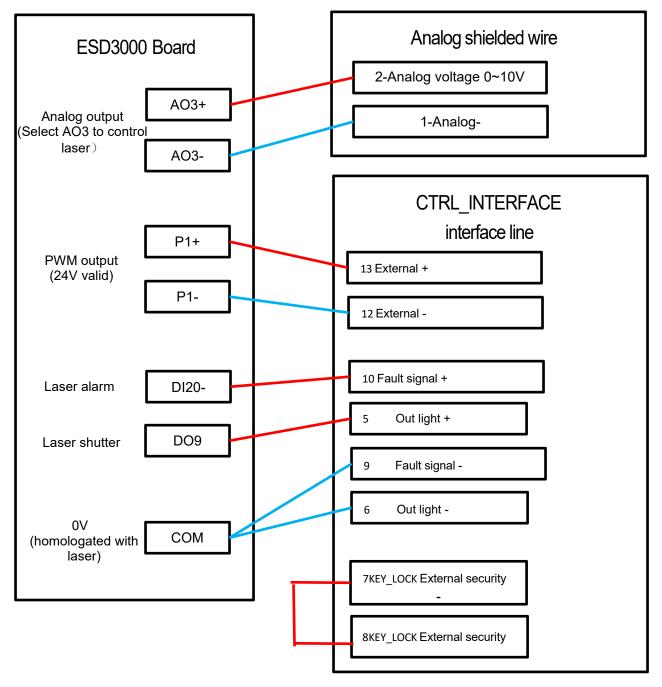


Notes:

1. PD+ PD- is the laser alarm output, connected to the DI20 input of the EDS3000 terminal block, "Platform Configuration - Digital Input - DI20" default Laser alarm (NO);

- 2. The red light and the light enable ground pin can be integrated into any 0V of the EDS3000 terminal block together to ensure the same source as the laser
- 3. Chuangxin laser PWM selects 24V to control.

2.5.2 Hotspot Single-mode Continuous Fiber Laser Wiring Diagram



Notes:

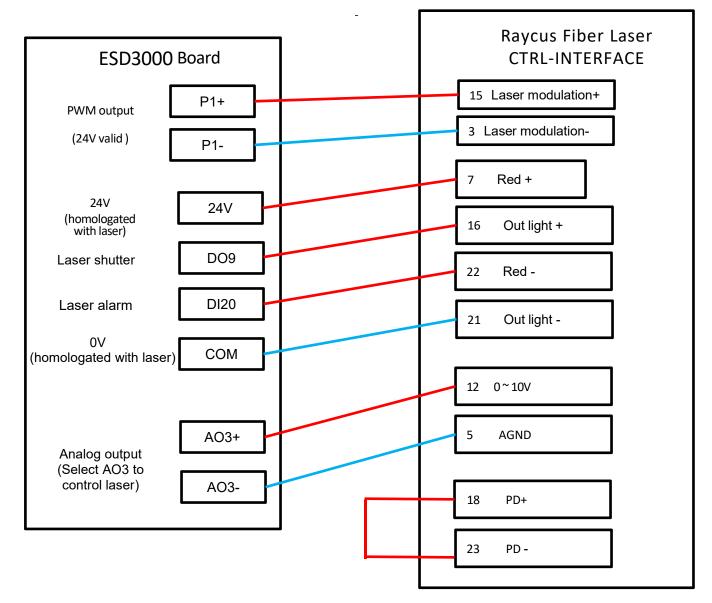
1. PD+ PD- is the laser alarm output, connected to the DI20 input of the EDS3000 terminal block, "Platform Configuration - Digital Input - DI2O" default Laser alarm (NO);

2. The red light and the light enable ground pin can be integrated into any 0V of the EDS3000

- terminal block together to ensure the same source as the laser
- 3. Hotspot laser PWM selects 24V to control.

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2.5.3 Raycus RFL-C3000 Continuous Fiber Laser Wiring Diagram



Notes:

1. In REM state, the control board is powered up to give a high level to enter the external AD mode.

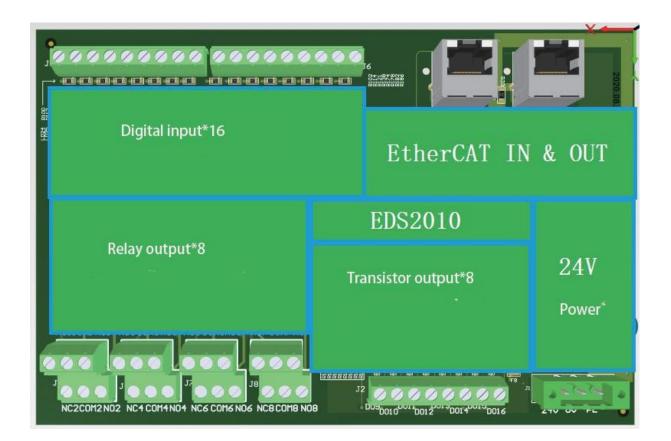
2. REM laser enable and red light for the same interface, up enable for closing red light, down enable for opening red light.

3. REM laser PWM selects 24V to control.

4. Laser system fault alarm output high level to the card.

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2.6 EDS2010 Interface Layout



The card has a form factor of 185mm*122mm and can be assembled on a module frame for use on DIN C4535 rails. The functional layout is shown in the figure below.

The upper left two RJ45 ports are connected to the EtherCAT cable, EtherCAT IN and EtherCAT OUT.

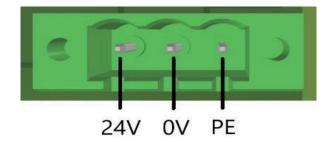
The upper right is the 16 digital input interfaces. For left: channel 1 to channel 8 and its common terminal; for right: channel 9 to Channel 16 and its common side.

The lower left to right is 8 sets of relay outputs and 8 transistor outputs.

The lower right corner is the board power supply, 24V power connector



2.6.1 Power connector



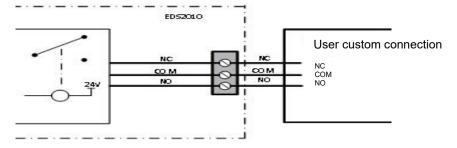
The EDS2010 board power interface needs to be connected to an external DC24V switching power supply, where the input terminals 24V, 0V and PE are connected to external switching power supply 24V, 0V and P E respectively.

2.6.2 Digital input interface

There are 16-way digital input DI interfaces, which are divided into two groups, each 8-way for a group and high and low active can be configured in groups. The common terminal of DI1-DI8 is COM1, and the common terminal of DI9-DI16 is COM2, where the input signal is active low when COM1 and COM2 are connected to 24V, and active high when COM1 and COM2 are connected to 0V.

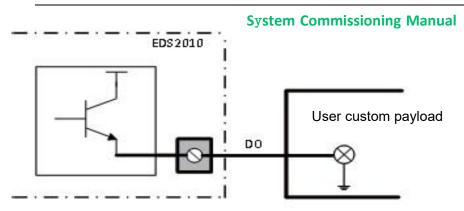
2.6.3 Output interface definition

DO1-DO8 are 8-way relay output mode refer to the following figure:



DO9-DO16 are 8-way transistor output mode refer to the following figure:

XC3000S Series Laser Cutting



3 Preparation for software installation

3.1 Self-hosted recommended configuration

CPU	Inter i5 1.6GHz (4 cores) and above
Memory	8GB and above
Storage Devices	120G hard drive and above
Network Card	2×10/100/1000 Gigabit NIC
USB	4×USB3.0 4×USB2.0
Show	Support both HDMI or VGA interface
Operating System	Genuine Windows 10 (64-bit Professional Edition) / Genuine Windows 7 (64-bit Flagship Edition)

3.2 Installation Software

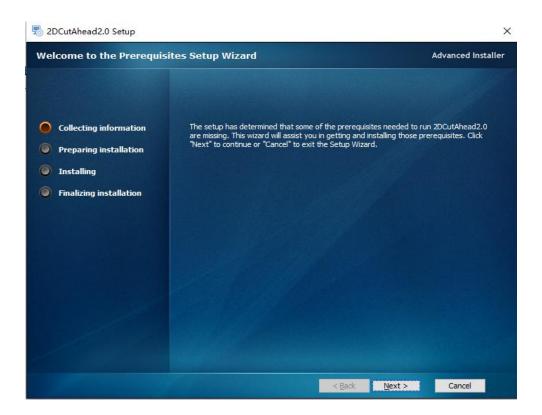
3.2.1 Installation of cutting software

1) Right-click on the software installation package and select Open or Run as Administrator.



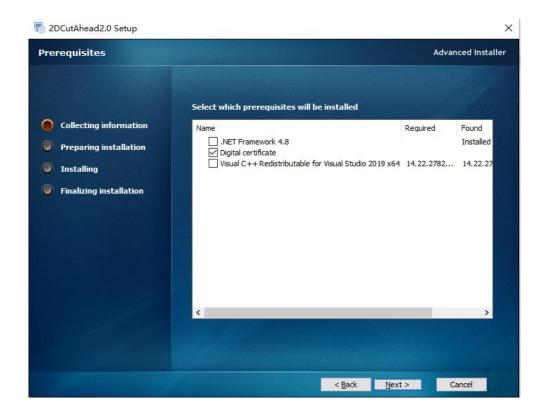


2) Follow the prompts and click Next.



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3) The installation environment. The system will automatically identify whether the installation environment is complete. It is not recommended to select it by yourself, you can directly click Next.



4) Select the installation path, the default installation path is C:/HMI, it is not recommended to change it, you can directly click Install.

👼 2DCutAhead2.0 Setup		3 <u>7.0</u>		×
Installation Folder		Ad	vanced li	nstaller
 Collecting information Preparing installation Installing Finalizing installation 	This is the folder where 2DCutAhead2.0 will be installed. To install in this folder, dick "Install". To install to a different folder, "Browse". Eolder: C: \HMI	enter it	below or o	
	< Back Install		Cancel	_

5) After the software installation is complete. Wait for the update of the underlying firmware, this step will take a long time, please be patient.

Update (underlying firmware version :242_20230717	
RavTooLs	Updating, please wait patiently	Exit
		¥

3.2.2 Filter by actual configuration

7) System: XC3000S; Keyword 1: EDS3000. Keyword 2: Pulse-dir drive or COE drive according to the actual configuration.

Filter criteria System XC3000S v Keyword1 EDS3000	✓ Keyword2	EDS3000	Se	earch
Config Description (C3000S+ COE drive+ EDS3000+EDS2010(Internal PLC pallet) (C3000S+ COE drive+ EDS3000 (C3000S+Pulse-dir drive+ EDS3000-EDS2010 (Internal PLC pallet) (C3000S+Pulse-dir drive+ EDS3000		EDS2000 Pulse-dir drive CCPE drive EIM Moudle DX150P EDS2010 Single Axis Gantry Axis Internal PLC pallet External PLC pallet		

8) Check the standard configuration in the configuration description, after which click Use selected config.

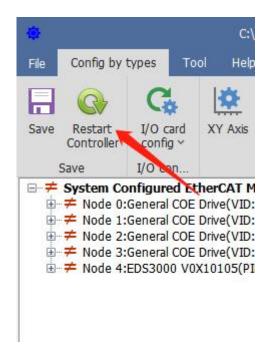
Filter criteria System XC3000S V Keyword1 EDS3000	✓ Keyword2 COE drive ✓ Search
Config Description XC3000S+COE drive+EDS3000+EDS2010(Internal PLC pallet) XC3000S+COE drive+EDS3000	□-System Configured EtherCAT Modules □-Node 0:General COE Drive(VID:0000000, PID:00000000 □-Node 1:General COE Drive(VID:0000000, PID:00000000 □-Node 2:General COE Drive(VID:00000000, PID:00000000 □-Node 3:General COE Drive(VID:00000000, PID:00000000 □-Node 4:GENERAL COE Drive(VID:00000000, PID:00000000 □-Node 4:EDS3000 V0X10105(PID:0000000b96)
<	,

3.2.3 Software parameters setting

Set the parameters of X, Y, and Z-axis, Pitch compensation, Verticality correction, Laser head, Laser Device, Assist gas, Dust removal valve, Alarm, Button, Pallet changer, Lubrication and other parameters according to the actual situation of the machine. Please refer to Chapter 5 "Platform Configuration Tools" for details.

3.2.4 Save and activate the master

9) Click Save and then click Restart Controller to update the master module configuration information.



10) Wait for the controller to restart, then click Exit config. Start HMI to open the cutting software.

Restart command has been sent	Restart kernel		
	Restart command h	as been sent	

3.2.5 Registration is required to open the process, you can register through the mobile WeChat applets.

		10:24	::!! † 🖬
		授权	••• •
		解密	
		692F4D-E8EEEE-EABC/EEEEE	0
		请选择更解密的设备(非必选)	v
License		授权期限: ◎ 指定日期 ○ 永久	
		● 指定日期 ○ 水久 授权截止日期:	
Machine Code:	691326-56EEEE-EZ03		新密
Registration Code:			
Expiration Reminder:	Register 3 Cay		
	2022 07 20 5		
Authorization period:	2023-07-20~Permanent	用户 计算机 知识表	

3.2.6 Use XC3000S software

After opening the software, import the graphics to be processed and configure the process parameters for processing. Please refer to the latest "XC3000S Series Laser Cutting System User Manual" for details.

3.3 Software Licensing

1) Open the software and click the "?" at the top right corner of the software page. 2) Open the WeChat applet "KIC Cloud", log in, click Authorize, then click Swipe icon and scan the QR code of the software, as shown in the figure below:

3) After scanning, the machine code and dog number will appear, and then select the "license expiration

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date".

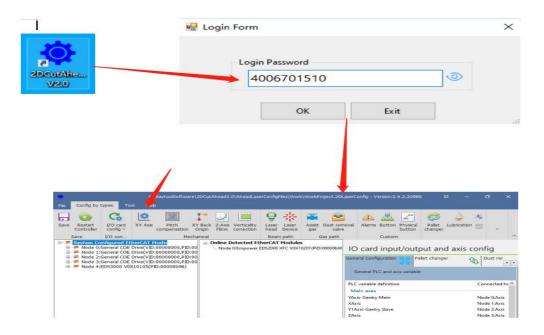
- 4) Click "Decrypt".
- 5) Copy the "registration code "in the interface into software registration code box.

6) Click "Register", you can see that the authorization period on the software has changed, as shown in the following figure:

08:49		::!! 🗢 🌠	
	授权	••• •	About ×
	解密		PN-M4015
692F4D-E8EEEE	-EZ03 EEEEE	13	Machine Name: M4015 Machine SN: 20220927-4015-7000 Release Date: 2021/8/2
请选择要解密的设	送备(非必选)		CNC System: 2DCutAhead 2.0 HMI Version: 2.4.2.21452 PLC Version: 21011.21445
授权期限:			CNC Version: 12C57ABA Engine Version: 19506
🔵 指定日期 🥝 刻	κ́久		CAM Version: 1.0.21138
重置		解密	Config Tool Version: 2.4.2.21446 License Machine Code: 692F4D-E8EEEE-EZ03 Registration Code: Register Expiration Reminder: 3 © Day Authorization period: 2023-06-09-Permanent Initialize
			Computer System Version: Microsoft Windows 10 专业版 64bit Processor: Intel(R) Core(TM) i5-6400 CPU @ 2.70GHz Memory Capacity 8.0 GB OS On: 2023-07-28 11:38 DSN: M00e2692f4de8DEEEEE RTC: 2023-08-01 08:49:48
○ : : : : : : : : : : : : : : : : : : :	知识库	していた。 使权 説的	Processing Control Auto return after Zero point Process selected only Enable soft-limit protection EdgeDetect before processing

4 Machine tool commissioning

After installation, a password 4006701510 is required to enter the configuration tool. Then you can select the category configuration in the menu bar, you will see the Parameter button. Click the corresponding parameter button, the parameter dialogue box will show to modify the parameter. After changing the parameter and checking it, restart the software then the changed parameter will take effect.



4.1 Set the parameters in the parameter screen according to the actual configuration

1) XY axis mechanical parameters and hardware configuration

XY axis mechanical parameters: Encoder pulse count, Pitch

XY axis point and port config: XY hard limit, XY axis servo axis port, XY soft limit.

axis mechanical parame	ter			X axis point and port of	config			
Encoder pulse count	10000 * *	Motor direction	Reverse V *	Positive hard limit signal	Node 4:DI_3	v	NO	v
Pitch	36mm * *	Backlash compensation	0mm * *	Zero signal	Node 4:DI_2	~	NO	v
Max speed	60m/min *	Max following offset	60mm *	Negative hard limit signal	Node 4:DI_1	~	NO	V
Max acceleration	10000mm/s^2 *			Servo axis	Node 1:Axis			1
						600 * mm		
Sync X parameters to 1	1 O Sync Y parar	neters to X1 🛛 🌒	Separate set	Soft limit range	-2 · ~		parate s	et
Sync X parameters to 1 axis mechanical parame		meters to X1 0	Separate set		O All limits NC			et
axis mechanical parame		meters to X1 •		O All limits NO	O All limits NC			
axis mechanical parame	ter		Reverse V *	O All limits NO Y axis point and port of	O All limits NC	€ Se	iparate s	``
axis mechanical parame	ter 10000 * *	Motor direction	Reverse v *	All limits NO Yaxis point and port of Positive hard limit signal	O All limits NC config Node 4:D <u>1</u> 6	0 Se ~	parate s	
axis mechanical parame Encoder pulse count	ter 10000 * * 36mm * *	··· Motor direction Backlash compensation	Reverse v *	All limits NO Yaxis point and port of Positive hard limit signal Zero signal	O All limits NC onfig Node 4:DI_6 Node 4:DI_5	© Se 	parate s	et 、

2) XY axis return to origin parameter

XY axis return to origin parameters: Return origin mode, Return origin direction and type, Zero signal, Aft back set coordinate.

		Y axis	
Return origi	Increment, \vee	Return origin	Increment ∨
Return origin direct	Negative 🗸 Limit 🗸	Return origin directi	Negative 🗸 Zero 🗸
Return oriq	1.8m/min *	Return oriq	1.8m/min *
back dis	5mm *	back dis	5mm *
Aft back set coordi	Omm *	Aft back set coordi	0mm *
Absolute zero of	0mm ×	Absolute zero of	0mm +



3) Z-axis parameters

Servo parameters: Pulse number, Pitch

Homing parameters: Homing mode, Return origin direction and type, Zero signal, Zero signal logic,

Coordinate aft backward set

Axis point and port config: Servo axis, positive and negative hard limit, soft limit

ervo Parameter		Return to Origin F	Parame	ter			
Motor direction	Positive 🗸 *	Homing	mode	Incremental Mode	~		
Pulse number	10000 * *	Return origin directio	on a	Positive ~ Lim	t v		
Pitch	10mm * *	Return origin	speed	0.9m/min *			
Max follow-up offset	5mm *	Back Dis	stance	5mm *			
Speed unit of Drive	pulse/s 🗸 *	Coordinate aft backy	ward	0 *			
	and the second second second						
Speed loop feedforwa	0.01 -	Origin point offset o		0mm +			
Speed loop feedforwa	0.01 -	axis point and po	com rt conf	ìg			
Speed loop feedforwa	0.01 *	axis point and point Serv	com rt conf ro axis	ig Node 3:Axis			
Speed loop feedforwa	0.01 +	axis point and po Serv Positive hard limit	com rt conf ro axis	ìg	~	~ N0	~
Speed loop feedforwa	0.01 +	axis point and point Serv	rt conf ro axis Node	ig Node 3:Axis	~		~
Speed loop feedforwa	0.01 *	axis point and po Serv Positive hard limit	rt conf ro axis Node	ig Node 3:Axis : 4:DI_9	~	NO	

4) Laser head

Laser head parameters: Brand, Model, Focus control mode, Height sensor type, Height sensor signal port.

Brand	Focus adjmt	
Raytools ~	Li	mit
Model	Soft Lim	it R
BS20K ~		Hea
Focus control mode	Close Cavity	
BS Smart Focus 🗸	Close Cavity	Gas
Height sensor type	Close WIFI A	larn
EDS On Board ~		
Height sensor signal port		
Node 4:Height Sensor Capacitan 🗸		

5) Laser Device

Laser brands and parameters: Laser brand, Laser power, Frequency

Laser brand:	Raycus 🗸 🗸	
Laser power:	1500 -	W
Frequency:	5000 -	Hz
Voltage of max power:	10 -	v
eedback voltage of max power:	10 -	v
Analog output delay	0 -	ms
FlyCut laser on delay	0 -	ms
FlyCut laser off delay	0 -	ms

6) Gas interface common settings

Gas pressure control: default can be, change if there are special needs. Gas process control: default can be, change if there are special needs. Pressure standard: default can be, change if there are special needs. Gas control: default can be, change if there are special needs.

7) Physical button

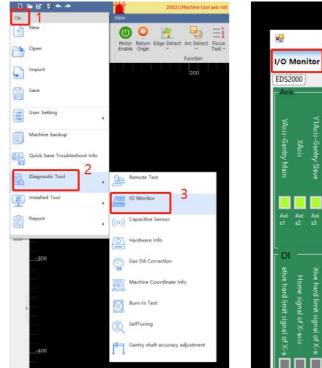
Control panel: Start signal logic, Pause signal logic, Reset signal logic, Emergency stop alarm logic

control Panel			
Start signal logic	Node 4:DI_14	~	NO ~
Pause signal logic	Node 4:DI_17	~	NO ~
Reset signal logic	Not used	~	NO ~
Emergency stop alar	Node 4:DI 13	~	NC ~

4.2 Test if each axis limit is effective

Note: The motor should be in the no enable state throughout this step!

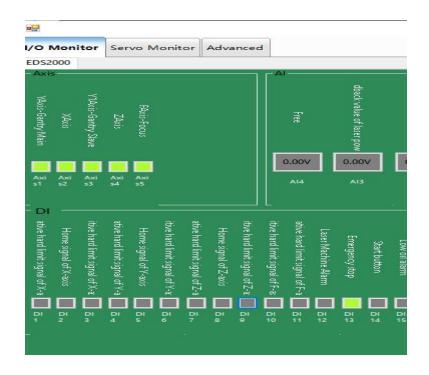
1) Enter the HMI software interface, File - Diagnostic Tool- IO Monitor





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 $2\,\,)\,$ Trigger the limit switch and observe whether the corresponding point position in the monitoring interface has changed



3) Verify the panel buttons for energy stop, each axis limit and zero switch, and start/pause in turn until each input is confirmed to be normal.

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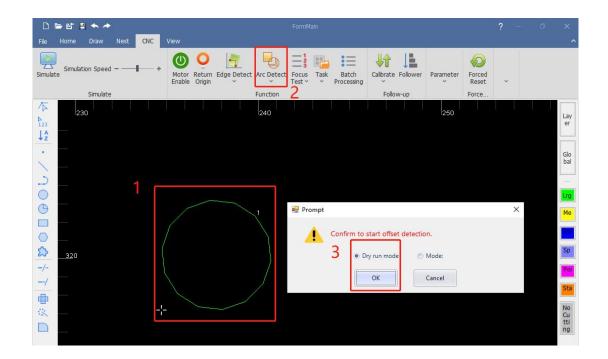
4.3 Zeroing the machine and adjusting the servo gain

1) Click CNC in the menu bar, click Return origin, and click OK in the pop-up window that appears.

View			FormM	ain				
Motor Enable	Edge Detect	Arc Detect	Focus Test ~	Task	Batch Processing	Calibrate Follo	~	Forced Reset
250 💀 Home set	1260	270		280	2	90 30		×
X Set Zero	Y Set Zero	Z eet Zero						
1.Please ensu 2.Return to th 	ling attention: ure that the limi he original statu origin] button	is:		rmal.				
							Exit	

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Draw a garden of about 30mm, turn on error detection, and then adjust the cutting speed to 30m/min up or down in the process. Then select the drawing and click on the empty walk.



After the motion is completed, the system draws the position of the encoder feedback on the software and the servo error can be seen using the measurement. This error can be used as the basis for adjusting the servo parameters.

5 Platform Configuration Tools

After installation, a password is required to enter the configuration tool, which is 4006701510.

5.1 Interface Introduction

	too8oftware)20CutAhead2.01/AheadLasetConfigFiles(Work/WorkProject.20LasetConfig - Version:2.4.2.20985 X — O X
File Config by types Tool Help	
Open Control Control	well Alms Batton Physical Palet Lubration Panel Segmentation Output Alms Batton Physical Palet Lubration Panel Segmentation Output Output Control ass config
□ ≠ System Configured EtherCAT Modu	
	IO card input/output and axis config
B ≠ Node 1:General COE Dive(VID:0000000,PID:00	General Configuration 🗾 Palet changer 🙀 Dust removal value 👼 Clustom 🖉 Extension axis config ү
	General Configuration 🔡 Palet changer 🕦 Dust removal valve 👼 Oustorn 🖉 Extension axis config 구
B HOR A-ERSON ANTOTOTAL BY COMPANY	General PLC and axis variable 2
	PLC variable definition Connected hardware pin
	Tel: ratio estinoni Contecteu naturere pri Main zone
	Vitario Surtry Main Node (Axis
	XAvis Node 1:Avis
	Y1Axis-Gantry Slave Node 2-Axis
	ZAxis Node3:Axis
	FAxis-Focus Node 4:Focus Axis (9-Pin)
	Height Sensor Capacitance
	Sensor capacitance value Node 4:Height Sensor Capacitance
	Digital input PLC variables
\rightarrow 3 \rightarrow 4	Negative hard limit signal of X-axis Node 4:DU1
	Home signal of X-axis Node 4012
	Positive hard limit signal of X-axis Node 4:01,3 5
	ndegstroce hand lamit signal or r-axis Node 4:00.4 Home signal of V-axis Node 4:00.5
	Tooline spaning to Teals tool of the state o
	Neative hard limit signal of Z-aris Node 40) 7
	Home signal of Z-sxis Node 4:DL8
	Positive hard limit signal of Z-axis Node 4:01.9
	Emergency stop Node 4:DL[13
	Start button Node 4:0[_14
	Oxygen pressure alarm Node 4-DL 18
	Pause button Node 401_17 Positive hard limit signal of F-ssis Node 401_10
	Positive hard limit signal of F-axis Node 400_10 Negative hard limit signal of F-axis Node 400_11
	Integrative nata timu, stylina to Francis Node 4:00 [19] Nitrogen pressure alarm Node 4:00 [19]
	Taking product and the second se
	Low cil alarm Node 4DI 15
	☑ Doplay all 🖳 Main axes 🔍 Digital input 🖉 Analog input 💭 PWM signal ☐ Hide all 🖳 Aux axes 🔍 Digital output 💭 Analog output
< > > < > >	Config Descript XCBUUS+COE drive+EDS3000
16:10:09:037 Comparing slave stations	7
16:10:09:040 ==>Module online detection failed. Please confirm current config matches the online module!	v
CNC online 🤡 2DCutAhead Cutting System	δ

1: Menu bar area; 2: PLC Variable Classification Area; 3: Current configuration area; 4: Online module area; 5: PLC Variable Area; 6: PLC Variable Pin Selection; 7: Journal area; 8: Status area

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5.1.1 Menu bar area

Including: File, category configuration, Tool and Help File



Save button: Save the current configuration file.



Restart kernel

Restart kernel: Activate current configuration Reads the configuration from the kernel module and import it into the current configuration area Activate current configuration

Category Configuration



Save button: Save the current configuration file.



Restart Controller: Activate the current configuration reads the configuration from the kernel module and import it into the current configuration area activates the current configuration.



Online Slave Check

Online Slave Check: Check if the connected modules are the same as the modules in the configuration area.



Import Standard Config

Import Standard Config: Import the standard configuration file preset by the system.



Activation history

Activation history: View the history of activations and select the history to load into the current configuration area.

• XY axis mechanical parameters and hardware configuration

XY axis mechanical parameters and hardware configuration, as shown in the figure below. Please refer to the 7.4.1 for details.

<u>e</u>	C:\RaytoolSoftware\2DCutAhead2.0\AheadLaserConfigF		ng - Version:2.4.2.20985 🔅	- 0
File Config by types Tool				
	🖄 🔳 🛟 📈 🗎 🖓	🔆 🎫 🔛 🎍	🔺 🚣 📶 🤣	۵. 🗠
Save Restart I/O card Controller config ~	XY Axis Pitch XY Back Z-Axis Verticality Laser compensation Origin Filow correction head	Laser Assist Dust removal Al Device gas valve	Jarms Button Physical Pallet Lu button changer	ibrication
Save I/O con	Mechanical Beam	n path Gas path	Custom	
XY mechanical para	ameter and hardware config			
X axis mechanical parameter		X axis point and port	config	
Encoder pulse count	10000 - Motor direction Reverse	Positive hard limit signal	Node 4:DI_3	NO ~
Pitch	36mm - Backlash compensation 0mm	- * Zero signal	Node 4:DI_2	NO ~
Max speed	60m/min * Max following offset 60mm	Negative hard limit signal	Node 4:DI_1 ~	NO ~
Max acceleration	10000mm/s^2 -	Servo axis	Node 1:Axis	~
		0.05.5	-2 600 - mm	
		Soft limit range	-2 * ~ 000 * mm	
		Soft limit range	-2 · ~ 000 · mm	
O Sync X parameters to Y1	O Sync Y parameters to Xt Separate set			eparate set
 Sync X parameters to Y1 Y-axis mechanical parameter 			• All limits NC • Se	
		t O All limits NO	O All limits NC ● Si	
Y-axis mechanical parameter		O All limits NO Y axis point and port * Positive hard limit signal	O All limits NC O S config Node 4:DL6 ~	eparate set
Y-axis mechanical parameter	10000 + • Motor direction Reverse	All limits NO Y axis point and port Positive hard limit signal T Zero signal	All limits NC S config Node 4:DI_6 V Node 4:DI_5 V	NO ~
Y-axis mechanical parameter Encoder pulse count Pitch	10000 - + Motor direction Reverse 36mm - * Backlash compensation 0mm	All limits NO Y axis point and port Positive hard limit signal T Zero signal	All limits NC S S Config Node 4:DI_6 ✓ Node 4:DI_5 ✓ Node 4:DI_4 ✓	NO ~
Y-axis mechanical parameter Encoder pulse count Pitch Max speed	10000 - * Motor direction Reverse 36mm - * Backlash compensation Omm 60m/min - Max following offset 60mm	All limits NO Y axis point and port Positive hard limit signal Zero signal Negative hard limit signal	All limits NC: Si config I I Node 4:D[_5 ~ I Node 4:D[_4 ~ I Node 6:D[_4 ~	NO ~ NO ~ NO ~ ~ ~
Y-axis mechanical parameter Encoder pulse count Pitch Max speed	10000 - * Motor direction Reverse 36mm - * Backlash compensation Omm 60m/min - Max following offset 60mm	All limits NO	All limits NC: Si config I I Node 4:D[_5 ~ I Node 4:D[_4 ~ I Node 6:D[_4 ~	NO ~ NO ~ NO ~ ~ ~
Y-axis mechanical parameter Encoder pulse count Pitch Max speed	10000 - * Motor direction Reverse 36mm - * Backlash compensation Omm 60m/min - Max following offset 60mm	All limits NO All limits NO Yaxis point and port Positive hard limit signal Negative hard limit signal Soft limit range	All limits NC Si Config Node 4:D_5 Node 4:D_4 Node 4:D_4 Si Node 4:D_4 Si Node 4:D_4 Si Config Node 4:D_4 Si Config Confi	NO ~ NO ~ NO ~ ~ ~
Y-axis mechanical parameter Encoder pulse count Pitch Max speed	10000 - * Motor direction Reverse 36mm - * Backlash compensation Omm 60m/min - Max following offset 60mm	All limits NO All limits NO Yaxis point and port Positive hard limit signal Zero signal Negative hard limit signal Servo axis Soft limit range Dual drive	All limits NC Srie Some direction Node 2:Axis Some direction >> Some direction >>	Imear motor
Y-axis mechanical parameter Encoder pulse count Pitch Max speed	10000 - * Motor direction Reverse 36mm - * Backlash compensation Omm 60m/min - Max following offset 60mm	All limits NO All limits NO Y axis point and port Positive hard limit signal Zero signal Negative hard limit signal Servo axis Soft limit range Dual drive Slave axis Y1 pot	All limits NC Sr config Node 4.DL5 Vode 4.DL5 Vode 4.DL4 Vode 0.Axis Node 0.Axis Oo → mm Node 2.Axis Same direction → * Gear reverse, Same direction → * Gear reverse in same	Parate set
Y-axis mechanical parameter Encoder pulse count Pitch Max speed	10000 - * Motor direction Reverse 36mm - * Backlash compensation Omm 60m/min - Max following offset 60mm	All limits NO Y axis point and port Positive hard limit signal Zero signal Negative hard limit signal Serva axis Soft limit range Dual drive Slave axis V1 pot Master-Slave Axes SVN	All limits NC Si Config Node 4:D _5 ✓ Node 4:D _5 ✓ Node 4:D _4 ✓ Node 2:Axis ✓ Node 2:Axis Same direction ✓ Gear reverse, or screw in sa 10mm ✓	Imear motor

• Pitch compensation (the parameters from the interferometer are imported, and the error is inverted according to the actual situation. The import file format rtl, pos, lin) is shown below. Please refer to the 7.4.2 for details.

IXD	Y axis						
Op	en Pitch						
File			Import	Offset	Note: After imported d	ata, select the offset	negation if with larger o
	No	Position	Positive measured	Positive offset	Reverse measured	Reverse offset	Reverse backlash
•	1	0	0.0214	-0.0214	0.0453	-0.0453	0.0239
	2	140	140.0227	-0.0227	140.0441	-0.0441	0.0214
	3	280	280.0204	-0.0204	280.0455	-0.0455	0.0251
	4	420	420.0096	-0.0096	420.0447	-0.0447	0.0352
	5	560	560.0290	-0.0290	560.0449	-0.0449	0.0160
	6	700	700.0351	-0.0351	700.0496	-0.0496	0.0145
	7	840	840.0247	-0.0247	840.0461	-0.0461	0.0215
	8	980	980.0252	-0.0252	980.0465	-0.0465	0.0214
	9	1120	1120.0292	-0.0292	1120.0487	-0.0487	0.0195
		1260	1260.0334	-0.0334	1260.0668	-0.0668	0.0334
	10	1200	1200.0334	-0.0334	1200.0008	-0.0008	0.0334
	96	1400	1200.0334	-0.0492	1400.0479	-0.0479	-0.0013
-0.00 -0.01 -0.01 -0.02	96 44 91 39						
0.00 0.01 0.01 0.02 0.02	96 44 91 39 87						
-0, 00 -0, 01 -0, 01 -0, 02 -0, 03 -0, 03	11 96 44 39 39 34 82						
-0.00 -0.01 -0.02 -0.02 -0.03 -0.03 -0.03	11 96 44 91 39 387 34 32 30						
0.00 0.01 0.02 0.02 0.03 0.03 0.03 0.04	11 96 44 91 39 34 82 30 77						
0.00 0.01 0.02 0.02 0.03 0.03 0.03 0.04 0.04	11 96 44 91 39 87 34 82 30 77 25						
Draw -0.00 -0.01 -0.02 -0.02 -0.03 -0.03 -0.04 -0.04 -0.05 -0.05	11 96 44 91 39 37 87 34						

♦ XY Back origin

XY Back origin parameter, as shown in the figure below. Please refer to the 7.4.3 for details.

C:\RaytoolSoftware\2DCutAl	tAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Version:2.4.2.20985 🛱 – 🗇	
File Config by types Tool Help		
Save Restart Controller I/O card U/O card I/O card Pitch Compensation Y Back Origin Save I/O con Mechalical	Fllow correction head Device gas valve button changer	_]
X axis	Y axis	
Return origi Increment: ~	Return origin Increment ~ Return origin directi Negative ~ Return origin 1.8m/min ~ n ~ back dis Smm ~ 3mm ~ Aft back set coordi 0mm ~	
PowerOn Config	: in starting software	

◆ Z-axis follow

The Z-axis follow parameters are shown in the figure below. Please refer to the 7.4.4 for details.

C:\RaytoolSoftw	re\2DCutAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Version:2.4.2.2098	
File Config by types Tool Help		
	XY Back Crigin Chanical XY Back Z-Axis Verticality Laser L	Palet Lubrication
Z-Axis Fllow Servo Parameter	Return to Origin Parameter	
Motor direction Positive Pulse number 10000 Pitch 10mm Max follow-up offset 5mm Speed unit of Drive pulse/s Speed loop feedforwa 0.01	Homing mode Incremental Mode Return origin direction a Positive Limit Return origin speed Back Distance Coordinate aft backward Origin point offset com Origin point offset com	
	axis point and port config	
	Servo axis Node 3:Axis Positive hard limit Node 4:DL9 NO Negative hard lim Node 4:DL7 NO Soft limit range -55 * 2 * Brake output Not used Vot used	



• Verticality correction

Verticality correction, as shown in the figure below. Please refer to the 7.4.5 for details.

🔅 C:\RaytoolSoftwar	re\2DCutAhead2.0\AheadLaserConfigFiles\Wor	rk\WorkProject.2DLaserConfig - Version:2.	4.2.20985 🖾 — 🗇 🗙
File Config by types Tool Help			
🗄 🚱 🥵 🖄 🔳	\$* ₽ 📃 9 *	🛎 🖄 🔺	
Save Restart I/O card XY Axis Pitch Controller config ~ compensation	XY Back Z-Axis Verticality Laser Laser Origin Fllow correction head Device	Assist Dust removal Alarms Button gas valve	Physical Pallet Lubrication button changer
Save I/O con Me	echanical Beam path	Gas path Custom	^
Verticality correction			
Verticality concetion			
Verticality correction			
1.Cut a rectangle. Measure and input AB,AC, L	1 and 13		
2.Select verticality correction and save			
Start verticality correcting			
Start verticality correcting			
Length AB 100mm Cv	D		
Length AB 100mm C	L1		
Length AC 100mm	\times		
Length L1 141.4mm	L2 B		
Length L2 141.4mm	×		
X-axis Tilt And	gle 0°		

• Laser head

Laser head parameters, as shown in the following figure. Please refer to the 7.4.6 for details.

👼 C:\RaytoolSoftware\2DCutAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Version:2.4.2.20985 🛱 — 🗗 🗙
File Config by types Tool Help
Save I/O com Save I/O com I/O com Save I/O c
Laser head
Brand Focus adjmt Raytools Model Soft Limit Rangemm -20 * -30 * BS20K -
S Restore to factory default

System Commissioning Manual

♦ Laser Device

Laser Device parameters, as shown in the following figure. Please refer to the 7.4.7 for details.

•	C:\RaytoolSoftware\2DC	utAhead2.0\Ahe	adLaserConfigFiles\Work\WorkProject.2DLaserConfig - Version:2.4.2.20985 🛛 🛱 — 🗇 🗙
File Config by types	Tool Help		
Save Restart Controller Save I/O co	g ~ compensation Origi	n Fllow corre	
Laser Device			
Board card output t	o laser signal		Laser Brand and Parameter
Laser Enable Laser Red Light Laser Shutter Laser Reset Laser power signal Laser power	Node 4:D0_9 Node 4:D0_10 Shutter and Red Light are mutua	lly exclusive	Laser brandt Raycus Laser power: 1500 * Frequency: 5000 * Voltage of max power: 10 * Voltage of max power: 10 * Feedback voltage of max power: 10 * Analog output delay 0 * FlyCut laser on delay 0 *
Laser input to board	All outputs of PWM		FlyCut laser off delay 0 * ms
Laser alarm:	Node 4:DI_20 ~	NO ~	
Chiller alarm:	Node 4:DI_21 ~	NO ~	
Safety door alarm:	Node 4:DI_22 Safety door alarm stop processing	NO ~	

♦ Assist gases

Assist gas cell valve and analog output settings, as shown below. Please refer to the 7.4.8 for details.

٠	C:\Rayto	oolSoftware\2DCutAl		rConfigFiles\Wo							
File Config b	y types Tool Help										
Save Restart Controlle Save			Z-Axis Verticality Fllow correction	Laser Laser head Device Beam path	1	Dust removal valve Gas path	Alarms Bu	tton Physical button stom	Pallet changer	Lubrication	
Assist ga	is magnetic valve a	and analog o	utput settir	ng							
Assist gas r	magnetic valve and analog o	output setting		1							
	Magnetic Valve	Proportion	Valve Power	Max pres		Proportion	Valve Analog				
Air No	ot used 🗸 🗸	Not used	~	30BA	R -	Not used		~	Main	n Magnetic Valve	
Oxygen No	ode 4:DO_1 ~	Not used	~	10BA	R -	Node 4:AO_2		~	Not used		~
Nitro No	ode 4:DO_2 ~	Not used	~	30BA	R -	Not used		~			
2.Singal	proportion valve power control is in green area support repeated ligital alarm and analog fee r	signal when open gas				Enable cutting.		d confi	Not used		~
	Digital gas pressure alar	rm Logic			Anal	log gas pressure f	eedback	Max pres	sure fee	Alarm threshold	d (
Air	Not used	~ NO	~	Air	Not used		· · · · · · · · · · · · · · · · · · ·	- 30BA	2 -	0 -	
Oxygen	Node 4:DI_18	~ NO	~	Oxygen	Not used			- 30BA	2 -	0 -	
Nitrogen	Node 4:DI_19	~ NO	~	Nitrogen	Not used		~	- 30BA	2 -	0 -	
1. Digita	Gas digital/analog alarm i I alarm configured on-demand,		_					-		ack sensor. If not, p ill be triggered. Wh	
Handling of	f gas pressure alarm during	processing									
	Suspend processin	ig when gas pressure a	alarm on C	Open 🗸							

System Commissioning Manual

• Dust removal valve

Dust removal valve parameters, as shown in the following figure. Please refer to the 7.4.9 for details.

C:\RaytoolSoftware\2DCutAhead2.0\/	.headLaserConfigFiles\Work\Wo	kProject.2DLaserC	onfig - Version:2.4.2.2098!			
File Config by types Tool Help						
	erticality rrection Beam path	ist Dust removal	Alarms Button Physical button Custom	Pallet L changer	ubrication	~
Dust removal valve						
Dust Removal Setting		1				
Enable partition output: 6 C Row 1 Col						
Close output po 3000ms *				•	(602,602)	
Only open output in cutting		Click to sele	d			
Overlayed area length(X/Y):		11 - 12 - 12 - 12 - 12 - 12 - 12 - 12 -	974 			
X: 20 + Y: 50 + © Set output port b O Set output by X-Y coordinates		Click to sele	d	502		
				401		
Note: 1. Click left mouse button and drag to adjust dust removal area. 2. Accurate adjust by pressing Ctrl key to drag		<u>4-DO8</u>				
		<u>4-D07</u>		301		
		<u>4-DO6</u>		201		
	(0.0)	<u>4-DO5</u>		100		
	×					

♦ Alarm

1-16 custom alarm settings, as shown below. Please refer to the 7.4.10 for details.

			Beam path	Gas path	Cu	button chang stom	t Lubrication ler	· ·
m alarm								
			Jarm info (EN)					Filtering time
								20
								10
								10
								10
1定义报警5报警							10	
		Customer Warning Custome	rSix					10
自定义报警7报警 Cust		Customer Warning Custome	rSeven	Normally open				10
自定义报警8报警 Cust		Customer Warning Custome	rEight	Normally open				10
自定义报警9报警 Custo		Customer Warning Custome	rNine	Normally open				10
同定义报警10报警		Customer Warning Custome	rTen	Normally open				10
定义报警11报警		Customer Warning Custome	rEleven	Normally open				10
定义报警12报警		Customer Warning Custome	rTwelve	Normally open	~	~	~	10
定义报警13报警	警13报警 Custome		rThirteen	Normally open	~	~	~	10
定义报警14报警		Customer Warning Custome	rFourteen	Normally open	~		~	10
定义报警15报警		Customer Warning Custome	rFiveTeen	Normally open	~			10
1定义报警16报警		Customer Warning Custome	rSixTeen	Normally open	~	~	1	10
	R等 定义报警3报警 定义报警4报警 定次报警4报警 定次报警4报警 定次报警4报警 定次报警4报警 定次报警4报警 定次报警4服警 定次报警14服警 定次报警134 定次报警134 定次报警134 記 定次指警134 記 第 3 4 定 次 指 影 1 5 指 影 1 5 指 影 1 5 指 影 1 5 指 影 1 5 指 影 2 定 次 指 影 5 二 次 指 第 5 二 次 指 第 5 二 次 指 5 二 (指 第 5 二 (指 第 5 二 (指 第 5 二 (指 第 5 二 (指 第 5 二 (指 第 5 二 (二 (二 (二) (二 (二 (二) (二 (二) (二 (二	R等 定 実 行 等 二 次 長等 3 R等 4 R等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 に 等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 次 4 R等 5 二 2 4 R等 5 二 2 4 R等 5 二 2 4 R等 5 二 2 4 R等 5 二 2 4 R等 5 二 2 4 R等 5 二 2 4 R等 5 二 2 4 R等 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 二 4 8 5 5 5 5 5 5 5 5 5 5 5 5 5	機響 Customer Warning Custome 定义报響対略 Customer Warning Custome 定义报響対相響 Customer Warning Custome 定义报響対相響 Customer Warning Custome 定义报響対相響 Customer Warning Custome 定义报響対相響 Customer Warning Custome 定义报響は損響 Customer Warning Custome 定义报響は指導 Customer Warning Custome 定义报響は指導 Customer Warning Custome 定义报響は指導 Customer Warning Custome 定义报響は指導 Customer Warning Custome	響 Customer Warning CustomerOne Customer Warning CustomerTwo Customer Warning CustomerThree Customer Warning CustomerThree Customer Warning CustomerThree Customer Warning CustomerFour Customer Warning CustomerFielt Customer Warning CustomerTen Customer Warning CustomerThreen Customer Warning CustomerFied Customer Warning CustomerThreen Customer Warning CustomerThreen Customer Warning CustomerFied Customer Warning C	器 See Customer Warning CustomerOne Normally open Customer Warning CustomerTwo Normally open Customer Warning CustomerThree Normally open Customer Warning CustomerThree Normally open Customer Warning CustomerThree Normally open Customer Warning CustomerThree Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFour Normally open Customer Warning CustomerFielht Normally open Customer Warning CustomerTen Normally open Customer Warning CustomerTwee Normally open Customer Warning CustomerTene Normally open Customer Warning CustomerFiveTeen Norm	R書 Customer Warning CustomerOne Normally open マ 定义投影対応器 Customer Warning CustomerTwo Normally open マ 定义投影対応器 Customer Warning CustomerThree Normally open マ 定义投影対応器 Customer Warning CustomerFour Normally open マ 定义投影対応器 Customer Warning CustomerFour Normally open マ 定义投影対応器 Customer Warning CustomerFixe Normally open マ 定义投影対応器 Customer Warning CustomerFisht Normally open マ 定义投影対応器 Customer Warning CustomerFisht Normally open マ 定义投影対応器 Customer Warning CustomerFieldet Normally open マ 定义投影づけ投影 Customer Warning CustomerFielder Normally open マ 定义投影づけ投影 Customer Warning CustomerFielder Normally open マ 定义投影づけ投影 Customer Warning CustomerThreen Normally open マ 定义投影づけ投影 Customer Warning CustomerTherteen Normally open マ	開き このでは、「「「「「」」」のでは、「」」の 「」」の 「」」の 「」」の 「」」の 「」」の 「」」の 「」」の	器等 Customer Warning CustomerOne Normally open マ マ マ マ マ マ マ ス Style Style Customer Warning CustomerTwo Normally open マ マ マ マ マ マ マ ス Style Style Customer Warning CustomerThree Normally open マ マ マ マ マ マ ス Style Customer Warning CustomerFore Normally open マ マ マ マ マ ス Style Style Customer Warning CustomerFore Normally open マ マ マ マ ア ス Style Customer Warning CustomerFore Normally open マ マ マ マ ア ス Style Customer Warning CustomerFore Normally open マ マ マ マ ア ス Style Style Customer Warning CustomerFore Normally open マ マ マ マ ア ス Style Style Customer Warning CustomerFore Normally open マ マ マ ア ア ス Style Style Customer Warning CustomerFore Normally open マ マ マ ア ス Style Style Customer Warning CustomerFore Normally open マ マ マ ア ス Style Style Customer Warning CustomerFore Normally open マ マ マ ア ス Style Style Customer Warning CustomerFieldt Normally open マ マ マ ア ス Style Style Customer Warning CustomerFieldt Normally open マ マ ア ア ス Style Style Customer Warning CustomerFieldt Normally open マ マ マ ア ス Style Style Customer Warning CustomerFieldt Normally open マ マ ア ア ス Style Style Customer Warning CustomerFieldt Normally open マ マ ア ア Style Style Customer Warning CustomerFieldt Normally open マ マ ア ア ス Style Style Customer Warning CustomerFieldt Normally open マ ア ア ア ア Style Style Customer Warning CustomerFieldt Normally open ア ア ア ア ア Style Style Style Customer Warning CustomerFieldt Normally open ア ア ア ア ア Style Style Style Customer Warning CustomerFieldt Normally open ア ア ア ア ア Style Style Style Style Customer Warning CustomerFieldt Normally open ア ア ア ア Style

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Button

Buttons are divided into custom buttons and physical buttons.

Custom button, as shown in the following figure. Please refer to the 7.4.11 for details.

ive Restart Controll Save		XY Axis Pitch compensa	XY Back Z-Axis Verticality Origin Flow correction Mechanical	A 12	Assist Dust removal gas valve Gas path	Alarms Button Physical Dallet change		
Custom	button					- -		
mber index	Used	Cmd ID	name (CNS)		name (EN)		Signal type	
1		401	备用1		Spare1		Triggered type sign	
2		402	备用2		Spare2		Holding type signal	
3		403	备用3		Spare3		Holding type signal	
4		404	备用4		Spare4	Spare4		
5		405	备用5		Spare5	Spare5		
6		406	备用6		Spare6	Spare6		
7		407	备用7		Spare7	Spare7		
8		408	备用8		Spare8		Holding type signal	
9		409	备用9		Spare9		Holding type signal	
10		410	备用10		Spare10	Spare10		
11		411	备用11		Spare11		Holding type signal	
12		412	备用12		Spare12	Spare12		
13		413	备用13		Spare13		Holding type signal	
14		414	备用14		Spare14	Spare14		
15		415	备用15		Spare15	Spare15		
16		416	备用16		Spare16		Holding type signal	

Physical button, as shown in the following figure. Please refer to the 7.4.12 for details.

2	C:\RaytoolSoft	ware\2DCutAhead2.0\Ahe	adLaserConfigFiles\Work\Wc	rkProject.2DLaser	Config - Version:2.4.2.20985		. 6	i x
ile Config by types	Tool Help					(
ave Restart Controller I/O config	ard XY Axis Pitch g × compensati	XY Back Z-Axis Vertix on Origin Filow correct Mechanical	ality Laser Laser As	sist Dust removal as valve Gas path	Alarms Button Physical button	Pallet Lubricatio	in 📺	~
Control Panel	4092011							
Control Panel			3-color light output	signal config				
Start signal logic	Node 4:DI_14	~ N0 ~	Red light	Node 4:DO_16	~			
Pause signal logic	Node 4:DI_17	~ NO ~	Yellow light	Node 4:DO_14	~			
Reset signal logic	Not used	~ NO ~	Green light	Node 4:DO_15	~			
Emergency stop alar	Node 4:DI_13	~ NC ~						

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• Pallet changer

Pallet changer parameters, as shown in the following figure. Please refer to the 7.4.13 for details.

Config by types Tool H Config by types Tool H VO can Config Save V/O con	s Pitch XY Back Z-Axis	Verticality Laser	Device gas valve button chan		000 000 Wiveless remote		
Start pallet changer	Horizontal switch	raulic líft	Motor lift O External pallet changer				
Signal Input			Signal Output	Hardware Button			
Emergency stop Stop Forward in-pos Backwerd in-pos Forward deceleration	Not used Not used Not used Not used Vot used	N0 ~ N0 ~ N0 ~	Forward Netword Exchange Netword High spees Netword Low spees Netword	Backwar OneKey exchang	Incrused NO Notured NO Notured NO Notured NO totured NO Notured NO	ч ч ч	
Backward deceleration Up-row unclamed in-pos logic Up-row champed in-pos logic Low-row unclamped in-pos logic Cylinder unclamped in-pos logic Cylinder champed in-pos sign.	Not used V Not used V Not used V 500 ms	NO ~ No ~	Low spee in <u>Not Units</u> Up-pallet cylinder unchanged in <u>Not units</u> Up-pallet cylinder changed in <u>Not used</u> Low-pallet cylinder unchanged in <u>Not used</u> Low-cylinder changed in <u>Not used</u>	Deser Manual mod Jog/Auto mode switc v			
Hydraulic lift							
Rise in-pos signal logic	Not used ~	N0 ~	Locking cylinder unclamped Not used	~			
Descent in-pos signal logic Up-pallet mark logic	Not used ~	NO V	Locking cylinder clamped Not used Hydraulic pump enable output Not used	~			
Low-pallet mark logic Cylinder unclamped in-pos logic	Not used ~ Not used ~	NO v	Rise command Not used Descent command Not used	* *			
Cylinder clamped in-pos logic	Not used V	NO V					

♦ Lubrication

Lubrication parameters, as shown in the figure below. Please refer to the 7.4.14 for details.

•	C:\RaytoolSoftware\2DCutAhead2.0\AheadLase	rConfigFiles\Work\WorkProject.2DLaserC	Config - Version:2.4.2.20985	X – D X
File Config by types To	ol Help			··
Save Restart Controller	XY Axis Pitch Compensation Origin Filow Correction	Laser Laser head Device Assist Dust removal valve	Alarms Button Physical button	Lubrication
Save I/O con	Mechanical	Beam path Gas path	Custom	^
Lubrication Interval Duration Pump overpressure alarm Low oil alarm Oil pump output	3 * h 30 * s Not used V Node 4:DI_15 NO Node 4:DD_12 V			

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Panel Control

1. Select the software interface display according to the display, as shown in the following figure:

😧 File Config by types Tool Help		C:\RaytoolSof	ftware\2DCutAhead2.0\Ahe	eadLaserConfigFiles\Wi	ork\WorkProject.2DLa	aserConfig - Ve
Restart I/O card XY Axis Pitch XY Bac Controller Config ~ XY Axis Pitch XY Bac Save I/O con Mechanica		Assist Dust removal valve Gas path	Alarms Button Physical button Custom		Panel Segmented axis config	000 000 Wireless remote
Save I/O con Mechanica Panel Control	Beam path	Gas path	Custom			
Mode Selection	₩ ₩ ₩					

2. Set Mainform height of the main interface, Number of camera, Camera brand, and Display monitor panel:

Mode Selection	Contain Monitor Pa
Mainform Settings	
Mainform Height	1080
Camera Setting	
Number of c	2 -
Camera brand	HIKVISION -

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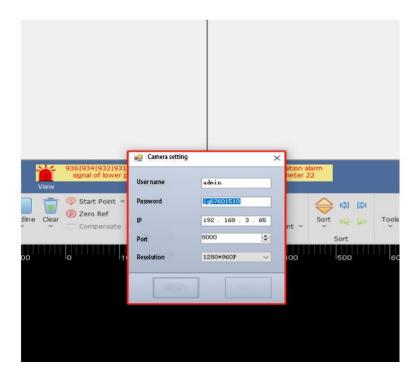
System Commissioning Manual

3. Open the software and right-click on an empty space in the monitoring panel.



Ł

4. Setting the camera's user name, password, IP, and port number↔



• Segmented axis configuration

Mechanical parameters and hardware configurations for the three segmented axis parameters C, V and B can be configured as shown below. Please refer to the 7.4.15 for details.

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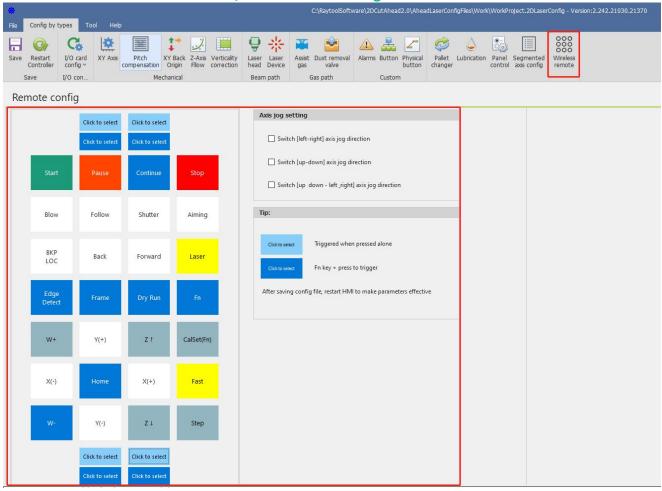
File Config by types Tool Help			C:\RaytoolS	oftware\2DCutAhead2.0\A	\headLaserConfigFiles\W	/ork\WorkProject.2DLaserConfig - V
Save Restart Controller Save I/O con M	XY Back Origin echanical	head Device gas	ust removal valve	Alarms Button Physical button Custom	Pallet Lubrication	Panel Segmented axis config
Segmented cutting axis parame	ter config				\neg	
C Axis V Axis B Axis						
Servo Parameter	Return to Origin Parame	eter				
Motor direction Negative ~ *	Homing mode	Set current point to $ \smallsetminus $				
Pulse number 10000 - *	Return origin direction a	Positive	-			
Pitch 10mm - *	Return origin speed	0.12m/min ~				
Speed unit of Drive pulse/s 🗸 *	Back Distance	5mm ×				
Speed loop feedforwa 0.01 ~	Coordinate aft backward s	0 ~				
Max follow-up offset 5mm -	Origin point offset compe	0mm ~				
System Latency 5ms *						
Manual Speed	axis point and port con	fig				
Manual slow 0.12m/min *	Servo axis Not	used 🗸				
Manual fast 0.24m/min *	Positive hard limit s	~	NO	~		
	Negative hard limit	~	NO	~		
Auto Speed	Soft limit Clos	• · · · ·				
Speed	Soft limit range	-10 ~ _ 10 ~	í.			
Acceleration 2000mm/s^2 *		-10 ·] ~ 10 ·	mm			
Acc time 100ms ~	Axis taq					
Torque control						
Motor polarity 1 ~						
Max torque 200 -						
Torque feedforward a 0 *						

♦ Handle configuration

You can configure the functions of K1~K4 and Fn+K1~K4 keys in the wireless handle, and you can also change the up/down/left/right axis motorized direction, as shown in the following figure.

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Tools



firmware: Update firmware

Update to the main control module firmware, the update will overwrite the original program and configuration information, then re-activate the configuration.



: Firmware authorization

For kernel master authorization, if not authorized, contact our after-sales professionals.



: Advanced option, please refer to the 7.4.16 for details.

Language: Simplified Chinese, Traditional Chinese and English are available.

Advanced option: Please do not change the check box, if you need to change, please contact us.



backup : Machine backup

Back up the machine configuration parameters, process parameters, and system parameters.



: Machine restore

Restore the machine configuration parameters, process parameters, and system parameters.

Help



: About

Copyright notice and tips for this software.



: Information

Set the machine name, machine model, machine number and machine factory date.

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5.1.2 PLC Variable Classification Area

By selecting different tabs, the variables displayed in the PLC variables area will follow the changes including: Flat General Configuration, Switchboard, Dust Extraction Valve, Custom

General Configuration

General Configuration. This tab contains: cutting motion axes, height sensors and PLC variables such as capacitance value, limit signal, button

input, nitrogen and oxygen pressure alarm, and start/pause / emergency stop /reset button can be selected through the PLC variable pin selection area.

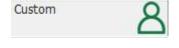


rð n

Dust removal valve

Pallet changer. This tab contains all the variables related to the switch.

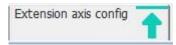
Dust removal valve. This tab contains the 32-way dust partition variables



Custom. This tab contains custom alarms, user custom IO inputs.

User custom I outputs, 16 of each, 48 variables in total.

Among them, custom alarm name and NO/NC can be set in the HMI alarm; user custom IO output can be customized in the HMI output point for hold or trigger type.



Extension axis config. This tab contains the PLC defined variable IO input 10 positive and 10 negative limits and 10 extension axes.

5.1.3 Current configuration area

You can view the current profile's point link definition and connection order in this area. You can also add, insert, change or delete slave and point link information; Please refer to section 5.3 for details.

5.1.4 Online Module Area

This area will only appear when the configuration of the current configuration area is different from the actual configuration, at which time the module online detection button will also have a red flashing alert.

5.1.5 PLC Variable Area

The PLC Variables area lists all PLC variables, and point link information.

5.1.6 PLC Variable Pin Selection

You can select variables by variable type, and find the required PLC variables faster.

5.1.7 Journal area

The log area displays important information such as the status of the connection to the master, whether the activation was successful, etc.

5.1.8 Status Area

The status area shows whether the CNC master is offline, whether the configuration platform is pipe cut or flat, the version number of the XStudio compilation, the Information such as whether the CCD pin is supported.

5.2 Configure and change points

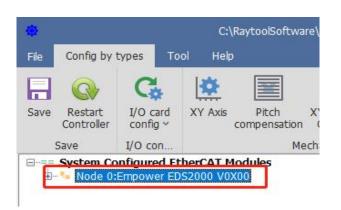
5.2.1 Operation on slave stations

Add:

1) Right-click - Append EtherCAT Node - select the slave to be added.

e Config by types Tool Help		
🗛 🔂 🖄 🔳	1* 🤍 🛄 😲	* 🎬 📔 🛆 🚣 📶 🥩 🛆 🔍
ve Restart I/O card XY Axis Pitch	XY Back Z-Axis Verticality Laser	Laser Assist Dust removal Alarms Button Physical Pallet Lubrication
Controller config ~ compensa		Device gas valve button changer ~
Save I/O con System Configured EtherCAT Modules	Mechanical Bean	n path Gas path Custom
System Configured EtherCAT Modules	Append EtherCAT node 2	Empower EDS2000 3
1	Insert EtherCAT node	Empower EDS3000
	Append EIM Module to EIM9100	Empower EDS2010(16In 16Out)
	Append EIM Module	Empower EDS100
	Insert EIM Module	Empower EDS2011(8In 8Out)
	Delete node	Empower C300 height controller
	Change node VID-PID	Empower DX150P
		Empower EIM9100
L.,	Update firmware	Empower-Cutting headBS06K/BS12K(PID:0000eb06)
	V1Axis-Gantry Slave	Empower-Cutting headBS20K(PID:0000eb10)
	ZAxis FAxis-Focus	Empower-Cutting headBS04KE(PID:0000eb12)
		Empower-Cutting headBS06KE(PID:0000eb13)
	Height Sensor Capacitance -	Empower-Cutting headBS08KE(PID:0000eb14)
	Sensor capacitance value	Empower-Cutting headBS12KE(PID:0000eb11)
	Digital input PLC variables —	Empower-Cutting headBS20KE(PID:0000eb15)
	Negative hard limit signal of X-ax Home signal of X-axis	LGR(PID:19501068)
	Positive hard limit signal of X-axi	Empower COE Drive(PID:003e0402)
	Negative hard limit signal of Y-ax	is INVT COE Drive(PID:0000000)
	Home signal of Y-axis Positive hard limit signal of Y-axi	
	Negative hard limit signal of Z-ax	
	Home signal of Z-axis	Panasonic COE Drive(PID:6038000a)
	Positive hard limit signal of Z-axi	s Delta COE Drive(PID:10305070)
	Emergency stop	Inovance COE Drive(PID:000c0108)
	Start button	KollMorgen COE Drive(PID:00414b44)
	Oxygen pressure alarm	CoolDrive Drive(PID:00000006)
	Pause button Positive hard limit signal of F-axis	LICHUAN ELECTRICAL Drive(PID:00001100)
	Negative hard limit signal of F-ax	
		General COE Drive(VID:0000000,PID:00000000)

2) Appending completed



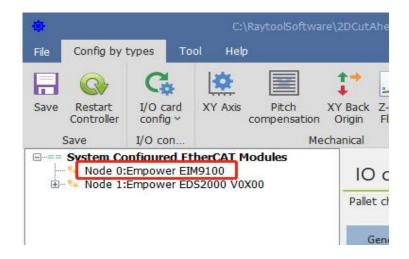
Insert

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1) Select the insert location, right-click - Insert EtherCAT Node - select the slave to be inserted.

🛟 C:\Raytoo	lSoftware\2DCutAhead2.0\AheadLaserConfigFiles\Wo		
File Config by types Tool Help			
Controller config ~ compe Save I/O con	tch XY Back Z-Axis Verticality Mechanical Beam path		Lubrication
System Configured EtherCAT Module Solution State St	IO card input/output a	nd axis config	
	Append EtherCAT node		
		Empower EDS2000	config
	Append EIM Module to EIM9100 ►	Empower EDS3000	
	Append Entritiodate	Empower EDS2010(16In 16Out)	
		Empower EDS100	-
	Delete node	Empower EDS2011(8In 8Out)	
	Change node VID-PID	Empower C300 height controller	
	Update firmware	Empower DX150P	
	· · · · · · · · · · · · · · · ·	Empower EIM9100	(
	FAsis-Focus Height Sensor Capacitance — Sensor capacitance value Digital input PLC variables — Negative hard limit signal of X-axis Positive hard limit signal of X-axis Negative hard limit signal of X-axis Negative hard limit signal of Y-axis Positive hard limit signal of X-axis Positive hard limit signal of X-axis Positive hard limit signal of X-axis Positive hard limit signal of X-axis Emergency stop Start button Oxygen pressure alarm Pause button Positive hard limit signal of F-axis Negative hard limit signal of F-axis	Empower-Cutting headBS06K/BS12K(PID:0000eb06) Empower-Cutting headBS06K(PID:0000eb10) Empower-Cutting headBS06KE(PID:0000eb12) Empower-Cutting headBS06KE(PID:0000eb13) Empower-Cutting headBS12KE(PID:0000eb14) Empower-Cutting headBS12KE(PID:0000eb15) LGR(PID:19501068) Empower COE Drive(PID:003e0402) INVT COE Drive(PID:003e0402) INVT COE Drive(PID:003e0402) ServoTronix COE Drive(PID:0030000) ServoTronix COE Drive(PID:0030000) ServoTronix COE Drive(PID:00301) Panasonic COE Drive(PID:003010) Delta COE Drive(PID:003108000) CoIDrive Drive(PID:0000108) KoIIMorgen COE Drive(PID:00414b44) CoOIDrive Drive(PID:0000000) LiCHUAN ELECTRICAL Drive(PID:00001100) DuanHui Drive(PID:00000000,PID:0000000)	

2) Insertion completed



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Delete

1) Select the slave that needs to be deleted, right-click - Delete node, and select Yes in the pop-

up dialog box

			C:\	RaytoolSoftwa	re\2DCut/	Ahead2.	0\AheadLa	serConfigFile
File	Config by	types To	ool Help					
Save	Restart Controller	I/O card config ~	XY Axis	Pitch compensation	XY Back Origin	Z-Axis Fllow	Verticality	
1	Save	I/O con		Me	chanical			Beam p
E==		Empower El		odules				1
		Empower El		Append Eth	erCAI no	de	•	
				Append EIN			9100	5
				Append EIN Insert EIM I		E.	۶ ۲	ariable
				Delete node	2			
				Change noo	de VID-PI	D		
				Update firm	nware			
					ZAx FAx	is is-Focus		_
		Warning				×	8	
		<u> </u>	Are you sure	you want to del	ete this no	de?		
			3	是(Y)	小否	D		

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2) Delete completed

٥			C:\	RaytoolSoftw	are\2DCut	Ahead2.()\AheadL	aserCor	nfigF	iles
File	Config by	types To	ol Help							
	G	C.			‡ *	Ż		ę		-
Save	Restart Controller	I/O card config ~	XY Axis	Pitch compensation		Z-Axis Fllow	Verticalit correctio	*: 122/03	ser ad	La De
	Save	I/O con		M	lechanical			B	eam	pa
		onfigured Et Empower ED			IC	carc	l <mark>inpu</mark>	t/ou	tpi	ut
	_				Palle	t change	er	欨	Dust	t re

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5.2.2 Changing the slave connection order

Method 1: Use the above add, insert, delete, and repeat operation to change the slave connection order. Method 2: Select the slave station you need to move, press and hold the mouse and drag it to the location you want to move, and then release the left mouse button.

Note: The order from top to bottom is the actual order of the actual network cable serial slave, and the position must correspond one by one, otherwise the slave can't enter the OP state, resulting in the software can't operate!

5.2.3 Linking operations to slave sites

Add link:

1) Select the hardware pins to be linked and right click - Connection request.

•		C:\Ray	toolSoftware\	2DCutAhead2.0\AheadLase	erConfigFiles\Work	WorkProject.2	2DLaserConfig	Version:2.	4.2.2103)	g —	٥	×
File Config by	types To	ol Help											
Save Restart Controller	C I/O card config ~ I/O con	XY Axis com		Y Back Z-Axis Verticality Flow correction	Laser Laser head Device Beam path		alve	ns Button Custor	Physical button	Pallet changer	Lubrication		~
🖻 🐤 Node 0			ules	IO card input/	output and	d axis cor	nfig						
Serv	vo Port_2<=; vo Port_3<=;	>		General Configuration	Pallet change	er ûr	Dust removal	valve d	🗂 Cust	om	2	Exten	ision :
	vo Port_4<=; us Axis (9-Pin ht Sensor Ca)<=>		General PLC and axis v	variable		1						
	2=>	<i></i>		PLC variable definition Main axes		C	onnected hard	vare pin					^
	4=> C 5=> D	onnection req elete connecti		YAxis-Gantry Main XAxis			lode 1:Servo Po lode 1:Servo Po	-					
	7=>	elete connecti		V1Axis-Gantry Slave		N	lode 1:Servo Po	t_3					
	9=>			ZAxis FAxis-Focus			lode 1:Servo Po lode 1:Focus Ax	- December 1					
	11=> 12=> 13=>			Height Sensor Capaci Sensor capacitance value	Ú.	N	lode 1:Height S	ensor Capa	citance				
	15=>			Digital input PLC varia Negative hard limit signa			lode 1:DI_1						
				Home signal of X-axis	of Y-avic		lode 1:DI_2						

2) Select the PLC variable to be linked in the PLC variable area and right-click - Confirm connection.

General Configuration	Dust removal valve 👝 Custom 🔗 Exter	nsion :
General PLC and axis variable		
PLC variable definition Main axes	Connected hardware pin	
YAxis-Gantry Main	Node 1:Servo Port 1	
XAxis	Node 1:Servo Port 2	
Y1Axis-Gantry Slave	Node 1:Servo Port_3	
ZAxis	Node 1:Servo Port_4	
FAxis-Focus	Node 1:Focus Axis (9-Pin)	
Height Sensor Capacitance		
Sensor capacitance value	Node 1:Height Sensor Capacitance	
Digital input PLC variables		
Negative hard limit signal of X-axis	Node 1:DI_1	
Home signal of X-axis 1	Node 1:DI_2	
Positive hard limit signal of X-axis	Node 1:DI_3	-
Negative hard limit signal of Y-axis	Node 1:DI_4 Confirm connection<=>Node 0:DI_3	
Home signal of Y-axis	Node 1:DI_5 Delete connection	
Positive hard limit signal of Y-axis	Node 1:DI_6 Display PLC path	
Negative hard limit signal of Z-axis	Node 1:DI_7	
Home signal of Z-axis	Node 1:DI_8	
Positive hard limit signal of Z-axis	Node 1:DI_9	
Emergency stop	Node 1:DI_13	
Start button	Node 1:DI_14	

3) The link is complete and both the current configuration area and the PLC variable area have dotted link information.

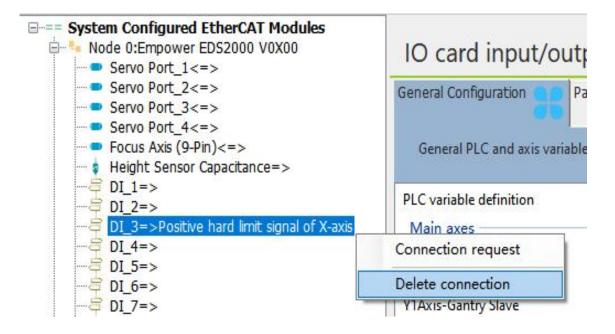
Config by t	types Too		re\2DCutAhead2.0\AheadLas	erConfigFiles\Wor	<\WorkProject.2DLaserC	Config - Version:2.4.2.2103	0 55	- 0	×
Save Restart Controller Save	I/O card config ~		XY Back Origin Z-Axis Ellow Verticality Fllow correction	Laser head Device Beam path	Assist Dust removal valve Gas path	Alarms Button Physical button Custom	Pallet Lubrica changer	ation	
	Empower EDS o Port_1<=>		IO card input						
- Serve	o Port_2<=> o Port_3<=>		General Configuration	Pallet chang	er 🙀 Dust re	emoval valve 🔂 Cust	om	8 Extension	1
	o Port_4<=> Is Axis (9-Pin)« ht Sensor Cap		General PLC and axis	variable	- 1	I			
DI_1			PLC variable definition		Connecter	d hardware pin			
		rd limit signal of X-axis	Main axes						
DI_4 경 DI 5			YAxis-Gantry Main		Node 1:Se	rvo Port_1			
			XAxis		Node 1:Se	rvo Port_2			
			V1Axis-Gantry Slave		Node 1:Se	rvo Port_3			
== DI_8			ZAxis		Node 1:Se	rvo Port_4			
			FAxis-Focus		Node 1:Fo	ocus Axis (9-Pin)			
			Height Sensor Capac	itance					
	2=>		Sensor capacitance valu		Node 1:He	eight Sensor Capacitance			
			Digital input PLC vari		100600				
DI_1			Negative hard limit sign						
- 2 DI_1			Home signal of X-axis	al of A-axis					
			Positive hard limit signa	Contraction of the second s	Node 0:DI				
DI_1			Negative hard limit sign		Node 0.DI				
			Home signal of Y-axis	ai or T=dxis					
2 DI_2	1=>		Positive hard limit signa	of V avis					
			Negative hard limit signa						
DI_2			Home signal of Z-axis						
> DI_2				-67					
			Positive hard limit signa	OT Z-axis					

Delete the link:

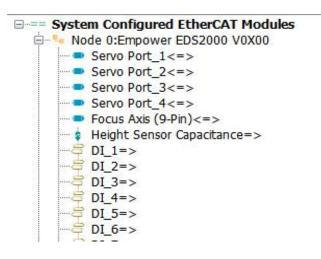
Method 1:

1) Select the pin in the current configuration area where the link needs to be removed and

right-click – Delete connection.



2) Delete completed



Method 2:

1) In the PLC Variables area, select the variable that needs to be deleted from the link and right-

click - Delete connection.

Digital input PLC variables		
Negative hard limit signal of X-axis		
Home signal of X-axis		
Positive hard limit signal of X-axis	Node 0:DI_3	
Negative hard limit signal of Y-axis		Confirm connection<=>Node 0:DI_3
Home signal of Y-axis		Delete connection
Positive hard limit signal of Y-axis		Display PLC path
Negative hard limit signal of Z-axis		and a barr

2) Delete completed

Change the link: first delete the original link, and then add the link again.

✓ Height Sensor Capacitance=> ✓ ☐ DI_1=>		
DI_1=>	PLC variable definition	Connected hardware pin
= DI_3=>	Main axes	
	YAxis-Gantry Main	Node 1:Servo Port_1
	XAxis	Node 1:Servo Port_2
== DI_7=>	Y1Axis-Gantry Slave	Node 1:Servo Port_3
	ZAxis	Node 1:Servo Port_4
== DI_9=> == DI_10=>	FAxis-Focus	Node 1:Focus Axis (9-Pin)
	Height Sensor Capacitance	
== DI_12=> == DI_13=>	Sensor capacitance value	Node 1:Height Sensor Capacitance
	Digital input PLC variables	
	Negative hard limit signal of X-axis	
	Home signal of V-avis	
	Positive hard limit signal of X-axis	
	Positive naro innit signal of X-axis	

5.3 Example Demonstration

To familiarize customers with the overall usage process, this section will demonstrate two examples with the following requirements: Example 1:

Requirements: 1. Import XC3000 standard configuration, machine configuration as follows:

4 pulse servos for X, Y, Y1, Z axes, one EDS3000 board, use this configuration for the points in the standard configuration.

Process:

Click

Open the configuration tool and enter the password: 4006701510.

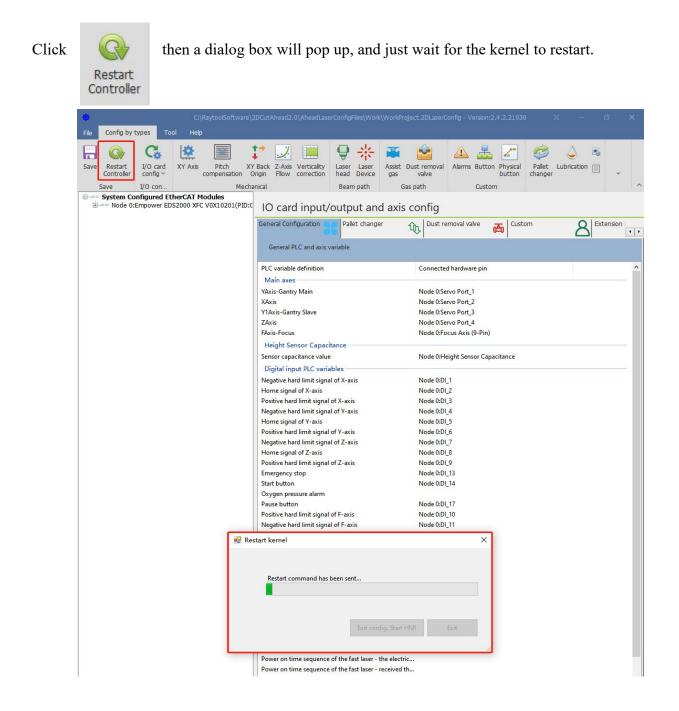


the Import Standard Config and then select XC3000S, EDS3000

Module, Pulse-dir servo in the pop-up box. After that check the unique file in the configuration and click Use selected config.

Standard configuration selection Filter criteria 2	3
System XC3000S ~ Keyword1 EDS2000	V Keyword2 Pulse-dir drive V Search
Config Description C3000S+Pulse-dir drive+EDS2000+EDS2010 (Internal PLC pallet) C3000S+Pulse-dir drive+EDS2000 4	E • System Configured EtherCAT Modules
>	5

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Example 2:

Requirements:

1. The existing machine configuration is as follows:

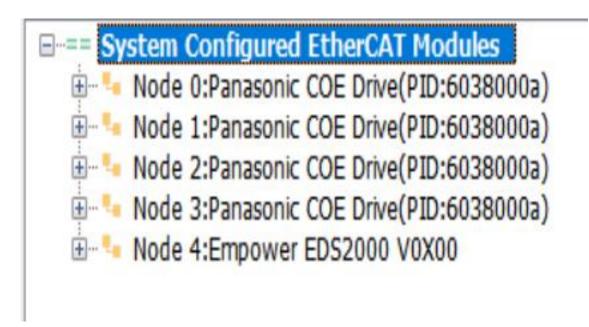
Panasonic servo motors 4, respectively for X, Y, Y1, Z axis, an EDS board, you need to connect all the limit signals according to the standard points, the network cable connection order is Y, X, Y1, Z, EDS3000 board, delete the nodes in the current configuration area and create a new configuration, backup the new configuration in order to import to other replicators with the same configuration.

Process:

1) Open the configuration tool and input the password: 4006701510 to delete the previous configuration

node through the operation in subsection 4.2.1.

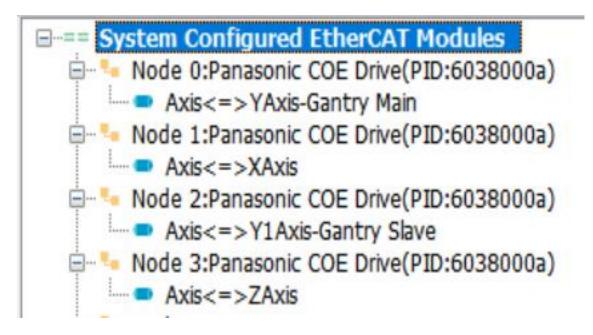
Add 4 Panasonic Servos and one EDS3000 board to the blank configuration and adjust the position according to the actual network cable connection order.



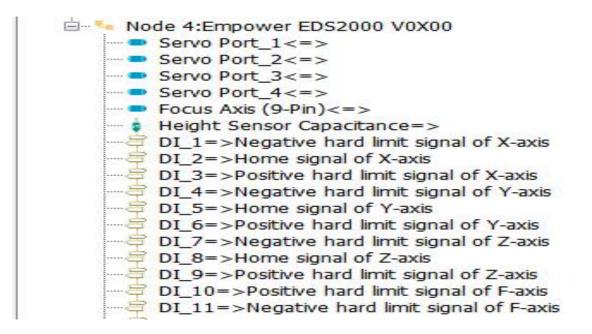
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2) Turn on the first servo (station 0) and connect it to the Y-axis; turn on the second

servo (station 1) and connect it to the X-axis; turn on the third servo (station 2) and connect it to the Y1-axis; turn on the fourth servo (station 3) and connect it to the Z-axis.



3) Tap on the EDS3000 and connect all limit signals according to the actual wiring.



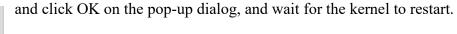
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Confirm the configuration and click Save, then click

in Tool under the sub-page to back up the current configuration. Subsequent copies of the model can be imported directly into this backup file.

Click





Config by types T	C:\RaytoolSoftware\2 ool Help	2DCutAhead2.0\AheadLaser0	ConfigFiles\Work\WorkP	roject.2DLaserConfig - Versi	on:2.4.2.21030	x – a
ave Restart Controller Save I/O con	compensation C Mecha	rigin Fllow correction	head Device gas	Dust removal valve Sas path Cu	tton Physical button changer	Lubrication
System Configured E	therCAT Modules DS2000 XFC V0X10201(PID:0	IO card input/o	utput and avi	config		
		General Configuration	Pallet changer	Dust removal valve	Custom	8 Extension
		General PLC and axis var	riable			
		PLC variable definition Main axes		Connected hardware p	in	
		YAxis-Gantry Main XAxis		Node 0:Servo Port_1 Node 0:Servo Port_2		
		Y1Axis-Gantry Slave		Node 0:Servo Port_3		
		ZAxis FAxis-Focus		Node 0:Servo Port_4 Node 0:Focus Axis (9-F	'in)	
		Height Sensor Capacita Sensor capacitance value		Node 0:Height Sensor	Capacitance	
		Digital input PLC variab Negative hard limit signal of		Node 0:DI_1		
		Home signal of X-axis Positive hard limit signal of	Y-avir	Node 0:DI_2 Node 0:DI_3		
		Negative hard limit signal o		Node 0:DI_4		
		Home signal of Y-axis		Node 0:DI_5		
		Positive hard limit signal of		Node 0:DI_6		
		Negative hard limit signal of Home signal of Z-axis	of Z-axis	Node 0:DI_7 Node 0:DI_8		
		Positive hard limit signal of	7-avie	Node 0:DI_8		
		Emergency stop		Node 0:DI_13		
		Start button		Node 0:DI_14		
		Oxygen pressure alarm				
		Pause button		Node 0:DI_17		
		Positive hard limit signal of		Node 0:DI_10		
		Negative hard limit signal of	of F-axis	Node 0:DI_11		
		Restart command has be Restart command has be Power on time sequence of Power on time sequence of	Exit config. Start f the fast laser - the elect	HMI Exit	×	
						E



For another machine with the same configuration, you can directly click to open the

previously saved backup file, to quickly copy the machine configuration and speed up the installation and commissioning efficiency.

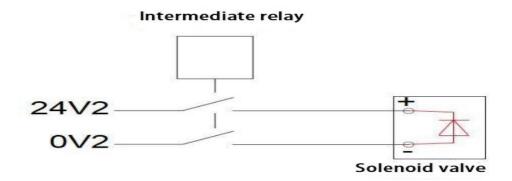
6 Precautions and exception handling

- 6.1 Electrical and commissioning considerations
- 6.1.1 Solenoid valve must be connected in parallel with a continuity diode



The diode has a unidirectional conductivity, that is, the diode anode and cathode with a positive voltage, the diode conducts. When the reverse voltage is added to the anode and cathode, the diode is cut off. Diode conduction and cut-off, then the equivalent of the switch on and off. Our diodes are equipped with MIC 6A10.

The following is a wiring diagram and a physical drawing



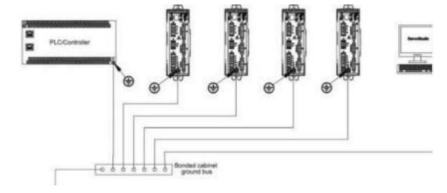
Note: When connecting the diode, you need to pay attention to the cathode and anode of the diode,

DC power 24V to the cathode of the diode, DC power 0V to the anode of the diode; Connection in reverse will lead to a short circuit.

6.1.2 Power supply wiring specification

1. The power supply requires electrical installation specifications and separation of low and high voltage.

2, 24 power supply and payload with the relatively large interference (such as servo, solenoid valve) and the controller should take power supply separately.



3. Servo grounding recommended to use star connection, as the correct connection can ensure the stable operation of the equipment.

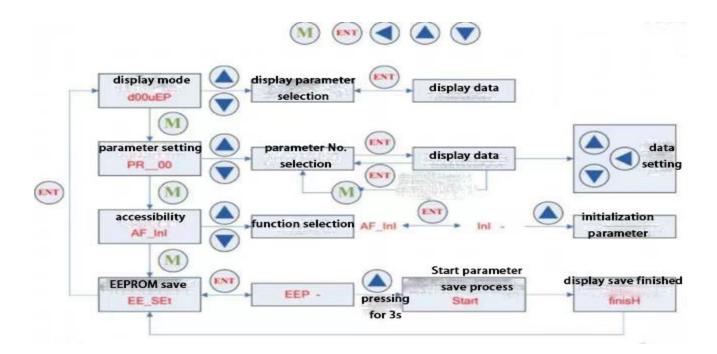
6.2 F-axis abnormality handling method

If F-axis control is abnormal without alarm when using axis control mode to control F-axis, please follow the steps below to troubleshoot.

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6.2.1 Control BM109 Cutting head abnormal treatment

If the servo does not have any alarm but the software has an F-axis drive alarm, change the drive parameter PR16 to 1 and save it according to the following procedure.



6.2.2 BM111 Yaskawa Focusing Driver

If the drive can be enabled, but cannot control the motor movement, please change the drive parameter Pn000 to 0011.

6.3 Normal Questions

System Commissioning Manual

6.3.1 Host cannot enter the system

1. Confirm that the host and monitor 220V power supply is normal, and use the universal

measurement host input power. The standard host power supply is DC12V.

2. Reboot the host to observe if it can enter the host interface normally.

3. Program run-down for abnormal system problems. The system is equipped with a one-key restore system function: one-key (OneKEY) to restore in the boot page.

6.3.2 Enter the system sheet showing that the slave is not connected or not

in OP status

1. Check whether the network cable order is connected as required, and the connection order please

refer to (1.2 System Composition and Connection Order).

2. Check the network cable and the board for bad contact.

6.3.3 Software interface to view slave communication status

If you encounter communication interruptions, check the following steps: Find the "Hardware" button on the left side of the main screen, and click on it to refer to the communication problems.

D	╘┖╘◆→		1		37 Z Axis past	max soft lin	nit					?	19996	ø	×
File	1		View												~
+	New		e Clear	the second s		verse ~	P Relief Fillet ~ & Cooling Point ~	Sor		Tools	Other				
				Proc	ess Setting				Sort						
A	Import		500	600	700	800	900	Lay	<u></u>	Coordin	ate System(X:341.0	6,Y:735		
	Save							er	Mark		Go Ma	ark		Record	1 -
								Glo	• \$		· · · · · ·			**	
=	User Setting	۲						bal	Shutter		Aimir	-		LaserDo	ot
								1	• #		• %		16	eller eller	-
	Machine backup							Lrg	Follow		Blow	v		Air	
	Quick Save Trouble	shoot Info						Me	•	(Y+	/			Z+
E	Diagnostic Tool	2.	B	Remote Test				Sp			X- ()	X	•)	Į	
	Installed Tool	×		IO Monitor				Poi	Preview)		-	~	-	
Ē	Report		((0))	Capacitive Sensor				Sta	Fast Jog Cut	10m	/min ~		Step	1m	nm -
					6			Cu tti			(1)			۲	
	-700		소	Hardware Info	3			ng	Start		Paus	e		Stop	
											<u>م</u>			۲	
			Q	Gas DA Correction					Frame		Sim			Dry Ru	n
	-800		ক্রা	Machine Coordinate Inf	io				\$		9				
			<u>зел</u>						Loop		Pt LO	С		Pt CON	т
				Burn-In Test					~		>			***	
	-900		()						Back		Forwa	ird		Return	0
			Q	SelfTuning											
	-1000		[**]	Gantry shaft accuracy a	djustment										



Slave station order	Slave station name	Op Status	P0-Crc	PO-PHY	P1-Crc	P1-PHY	P2-Crc	P2-PHY		
0	HCFA	OP	0	0	0	0				
1	HCFA	OP	0	0	0	0				
2	HCFA	OP	0	0	0	0				
3	HCFA	OP	0	0	0	0				
4	EDS3000	OP	0	140						
Master0 Phase: Operatio Active: ves	n								 	
	n								 	
Phase: Operatio Active: yes Slaves: 5 Ethernet devices									 	
Phase: Operatio Active: yes Slaves: 5 Ethernet devices Main: 00:e2:69:	s: 2a:47:76 (attached)								 	
Phase: Operatio Active: yes Slaves: 5 Ethernet devices Main: 00:e2:69: Link: UP	s: 2a:47:76 (attached) 5650978								 	
Phase: Operatio Active: yes Slaves: 5 Ethernet devices Main: 00:e2:69: Link: UP Tx frames: 15	s: 2a:47:76 (attached) 5650978 51699690									

System Commissioning Manual

If the OP status column doesn't show OP, the communication is not connected; if PO-Crc or P0-PHY has a non-zero value in any column, it means the slave is interfered with, and if the value is large, it means the communication is broken. You need to find the appropriate slave to observe if it is a wiring alignment problem, or a hardware or network cable problem.

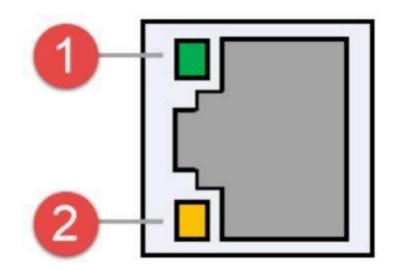
Note: All network cables, encoder cables and sensor cables on the amplifier should not be tied together with the power cable.

If the servo is connected to the servo through the network cable, and the communication interruption between the servo is detected, check whether the network cable between the servo and the servo is well connected, and whether the connection between the crystal head of the network cable and the servo is well connected and loose.

Wiring Precautions:

(1.) Confirm that the site of the electrical control cabinet is well grounded. Resistance within 10 ohms, the smaller the better (preferably can be installed independent ground stake, only for laser cutting machine)

(2.) Low voltage and high voltage cables need to be separated. Don't entangle each other Network cable connection display indication



EtherCAT Interface / Ethernet Interface

	EtherCAT Interface Connection Status								
	Description								
EtherCAT	Tags	Description	LED Color	Status	Description				
	1: Speed	EtherCAT bus	Green	Extinguished	10 Mbps connection				
		connection speed		Always bright	100 Mbps connection				
			Orange	Always bright	1000 Mbps connection				
	2: LINK	EtherCAT	Yellow	Extinguished	No connection				
		Bus Link		Blinking	In data communication				
		Status		Always bright	Connected				

	Ethernet interface connection status description							
-								
	Tags	Description	LED Color	Status	Description			
Ethernet	1: Speed	Ethernet communication	Green	Extinguished	10 Mbps connection			
		connection speed		Always bright	100 Mbps connection			
			Orange	Always bright	1000 Mbps connection			
	2: LINK	Ethernet	Yellow	Extinguished	No connection			
	Communication		Blinking	In data communication				
		link		Always bright	Connected			
		status						

System Commissioning Manual

7 Appendix

7.1 EDS2000 (Optional)

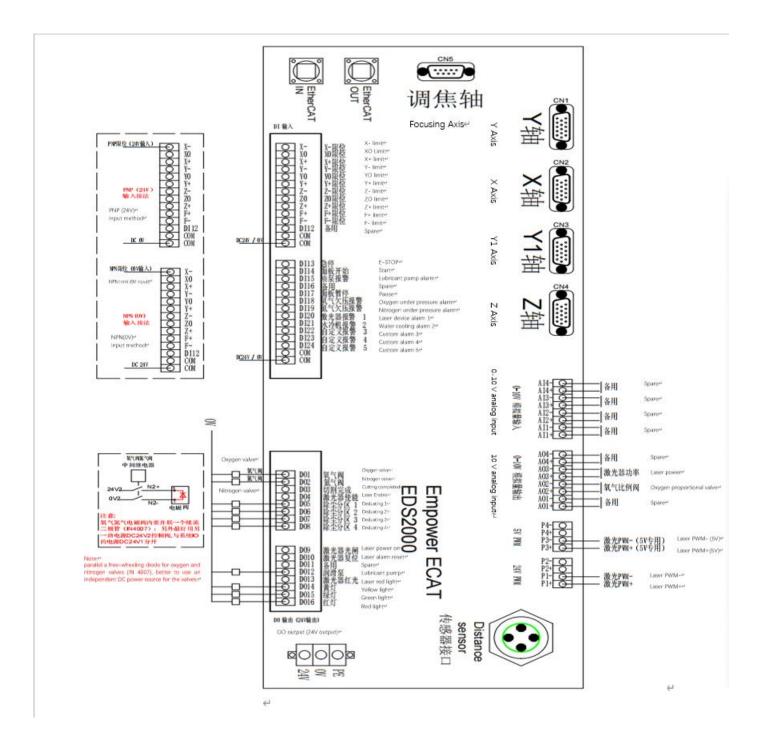
The XC3000S is compatible with the EDS2000 board. EDS2000 is available when EDS3000 is not used.

7.1.1 EDS2000 IO Card

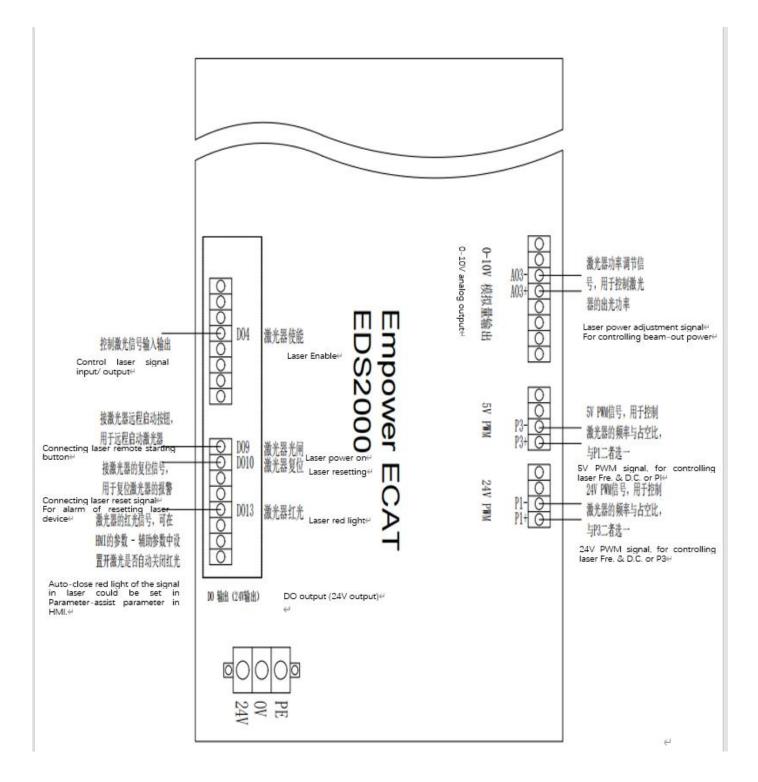


The EDS2000 is an EtherCAT bus-based slave interface board with a rich set of IO, motion control and laser follower interfaces and resources, especially for signal acquisition and motion control applications in the laser industry.

7.1.2 EDS2000 Wiring Diagram



7.1.3 EDS2000 Laser Point Diagram



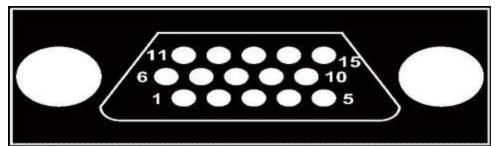
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7.1.4 EDS2000 Servo Drive Interface

1) The four servo control interfaces on the general-purpose axis (X,Y, Y1, Z) interface board are three-row

DB15 (hole) sockets, as shown in the figure below



The pins are defined as follows:

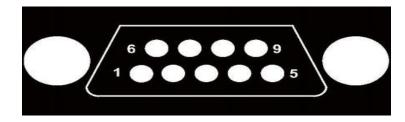
Foot	Signal	Function	Foot	Signal	Function
number	Name		number	Name	
1	A+	A-phase encoder pulse	13	XD+	Axis rotation
		input +			direction switching
					output +
2	A-	A-phase encoder pulse	14	XD-	Axis rotation direction
		input -			switching output -
3	B+	B-phase encoder pulse	8	ALM	Servo alarm input
		input +			
4	В-	B-phase encoder pulse	9	SON	Servo enable output
		input -			
5	Z+	Z-phase encoder pulse	10	CLR	Axis Clear Output
		input +			
7	Z-	Z-phase encoder pulse	6	P24V	24V power supply
		input -			
11	XP+	Axis speed control	15	PGND	Power Ground
		output +			
12	XP-	Axis speed control			



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		ouipui -		
		1		
_ L				

2) The 1 F-axis control connector on the focus axis (F-axis) interface board is a two-row DB9 (hole) socket, as shown in the following figure:



The pins are defined as follows:

	F-axis interface signal description								
Foot number	Signal Name	Function	Foot number	Signal Name	Function				
1	CLR	Axis Clear Output	6	SON	Axis rotation direction switching output +				
2	ALM	Servo alarm input	7	РР	Axis rotation direction switching output -				
3	NP	Axis speed control output -	8	ND	Servo alarm input				
4	PD	Axis rotation direction switching output +	9	PGND	Servo enable output				
5	P24V	24V power supply							

Note: EDS2000 board SON and ALM signals are active low (0V output active and 0V input active).

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3) Servo driver control signal wiring diagram.

The following items should be noted when connecting the servo drive:

The EDS2000 uses a pulse + direction signal to control the servo drive, and you must confirm that the drive supports this mode.

Confirm the selected type of Servo Drive Enable Signal (SON) is active low (ON when conducting with 24V power ground).

Confirm the selected type of Servo Drive alarm signal (ALM) is active low (ON when conducting with 24V power ground).

Confirm the servo drive parameters are set correctly. If the servo cannot run, the parameters should be set to "Forward and reverse input disable". The F-axis servo interface is an open-loop control interface and does not support encoder signal input.

Wiring with Yaskawa, HCFA, Panasonic, Delta B series & A2 series, and Fuji servo drives, please refer to the following wiring diagram.

If you have any questions, please consult our technical professionals.

7.1.5 EDS2000 Servo Drive Interface

Yaskawa E-7 Series AC Servo Drive

Wiring Diagram

Servo control interface EDS3000-DB15 3-pin(male)			shielded wire	Yaskaw	va servo	o 50 Pin in	
Signal	Pin	Line				Pin	Signal	
A+	3	purple	11		1	33	PAO	
A-	11	yellow				34	/PAO	
B+	4	yellow & black				35	PBO	
B-	12	blue	11		11	36	/PBO	
Z+	5	blue & black	11			19	PC0	
Z	13	black & white	1.1		1	20	/PC0	
<u>Х</u> Р+ ХР-	1	red & black				7	PULSE /PULSE	
XP ⁻ XD+	2	green green & black	11		1	0	SIGN	
XD-	10	brown	++		++	12	/SIGN	
ALM SON CLR P24V PGND	14 6 7 8 15	orange orange &black red & black black black				31 40 44 47 1	ALM+ /S-ON /ALM-RST +24VIN SG	
						32	ALM-	

	Yasi	kawa Servo Setting Parameters
Parameter Type	Recommended	Setting range
	Value	
Pn000	0.0.1.0	0.0.x.0 (0 speed; 1 position) 0.0.0.X (0 forward; 1 reverse)
Pn000		0.X.0.0 (0 three-phase power; 1 single-phase power); 0.0.0.X (0 display setting, 1 display all parameters)



Pn200	0.0.0.0	0.0.0.X (0 pulses + direction positive logic, 5 pulses + direction negative logic). X.0.0.0 (linear 1M)
Pn50A	8100	Positive turn prohibition cancellation
Pn50B	6548	Reverse ban cancellation

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HCFA Servo Drive Wiring Diagram

5 3-pin (m	ale)		shielded wire		HCFA serv	0 SU PIN II
Signal	Pin	Line	/		Line	Signal
A+	3	purple	TA	11	36	OUTA
A-	11	yellow	1 1	1 1	37	/OUTA
B+	4	yellow&black	1 1	1 1	38	OUTB
B-	12	blue	1 1	1 1	39	/OUTB
Z+	5	blue&black	<u>, , , , , , , , , , , , , , , , , , , </u>		40	OUTZ
Z-	13	black&white			41	/OUTZ
XP+	1	red&black			26	CMD PLS
XP-	9	green			27	/CMD PLS
XD+	2	green&black			30	CMD DIR
XD-	10	brown			31	/CMD DIF
ALM	14	orange	1		21	S ERR+
SON	6	orange&black			4	S ON
CLR	7	red&black	11		5	ERR-RST
P24V	8	black	11	11	3	COM+
PGND	15	brown&black	N I	11	12	COM-
			<u>ــــــــــــــــــــــــــــــــــــ</u>		22	S ERR-

	HCF	A Servo Setting Parameters
Parameter	Recommended	Setting range
Туре	Value	
P00-01	0	0 Position mode; 1 Speed mode; 7 Bus mode
P00-07	0	0: Pulse + direction positive logic; 1 Pulse - direction negative logic
P00-16	1	0: forward; 1: reverse

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Panasonic MINAS A6 AC Servo Drive

Wiring Diagram

315 3-pin(m	nale)		shielded wire			1
Signal	Pin	Line			Pin	Signa
A+	3	purple	1	1	21	OA+
A-	11	yellow			22	OA-
B+	4	yellow&black			48	0B+
B-	12	blue			49	OB-
Z+	5	blue&black	Î.		23	0Z+
Z-	13	black&white	1		24	0Z-
XP+	1	red&black			- 44	PULSH1
XP-	9	green	-	_	45	PULSH2
XD+	2	green&black	4		46	SIGNH1
XD-	10	brown	1		47	SIGNH2
ALM	14	orange			37	ALM+
SON	6	orange&black	i	-+	29	SRV-ON
CLR	7	red&black	1		31	A-CLR
P24V	8	black	+		7	COM+
	15	brown&black	1	11	41	COM-

	Panasonic Servo Setting Parameters					
Parameter	Recommended	Setting range				
Туре	Value					
Pr001	0	0: Position control, 1: Speed control				
Pr007	3	3: Pulse plus direction				
Pr005	1	1: High-speed pulse 3mpa;0: Low- speed pulse 500kpps				



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Delta B Series Servo Drive

Wiring Diagram

Servo control interface

Delta servo 44 Pin interface

ignal	Pin	Line	~	Pin	Signal
A+	3	purple	1	21	OA
A-	11	yellow	-	22	/OA
B+	4	yellow&black		25	OB
B-	12	blue		23	/0B
Z+	5	blue&black		13	ΟZ
Z-	13	black&white		24	/0Z
XP+	1	red&black		38	HPULSE
XP-	9	green		36	/HPULSE
XD+	2	green&black	-	42	HSIGN
XD-	10	brown		40	/HSIGN
ALM	14	orange		28	ALRM+
SON	6	orange&black	1	9	SON
CLR	7	red&black	+	33	ARST
P24V	8	black	1	11	COM+
PGND	15	brown&black		14	COM-
				27	ALRM-

Signal	Pin	Line		Pin	Signal
orginal		Line	~	7.	Signal
A+	3	purple		21	OA
A-	11	yellow		22	/0A
B+	4	yellow&black		25	OB
B-	12	blue		23	/0B
Z+	5	blue&black		50	0Z
Z-	13	black&white		24	/0Z
XP+	1	red&black		38	HPULSE
XP-	9	green		29	/HPULSE
XD+	2		1	46	HSIGN
00000000		green&black	É.		
XD-	10	brown	1	40	/HSIGN
ALM	14	orange		28	005+ ALRM
SON	6	orange&black	1	9	DI1 SON
CLR	7	red&black	- i	33	DI5 ARST
P24V	8	black	+	11	COM+
PGND	15	brown&black		45	COM-
			·	27	D05-

	Delta Servo Sett	ting Parameters
Parameter	Recommended	Setting range
Туре	Value	
P1-00	0x1002	Thousands of bits 1 High-speed differential
P1-01	0x0000	Percentile 1 is the reverse
P2-10	0x0101	DI1

Fuji ALPHA5 Smart Servo Drive

Wiring Diagram

Servo control interface

Signal	Pin Line 😽	Pin	Signa
A+	3 purple	9	FFA
A-	11 yellow	10	*FFA
B+	4 yellow&black	11	FFB
B-	12 blue	12	*FFB
Z+	5 blue&black	23	FFZ
Z-	13 black&white	24	*FFZ
XP+	1 red&black	7	CA
XP-	9 green	8	*CA
XD+	2 green&black	20	CB
XD-	10 brown	21	*CB
ALM	14 orange	17	OUT3
SON	6 orange&black	2	CONT1
CLR	7 red&black	3	CONT2
P24V	8 black	1	COMIN
PGND	15 brown&black	14	COMOU

	Fuji Servo Setting Parameters				
Parameter	Recommended	Setting range			
Туре	Value				
PA-101	0	0position 1speed 2torque 3position <=> speed 4position <=>			
		Torque 5Speed <=> Torque 6Extended mode 7Positioning operation			
PA-103	1	 0Differential input: Command pulse/symbol 1Differential input: Forward pulse/reverse Pulse 2differential input :90° bit phase difference 2 signal 10open collector input Command pulse/symbol 11 open collector input: 			
		forward pulse/reverse pulse 12open collector input :90° bit phase difference 2 signal			

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F-axis Yaskawa servo drive wiring

diagram

		shielded wire		S. Human
Signal	Pin	Line	Pin	Signal
XP+	7	red&black /	7	PULS
XP-	3	green	8	/PULS
XD+	8	green&black	11	SIGN
XD-	4	brown	12	/SIGN
ALM	2	orange	31	ALM+
SON	6	orange&black	40	/S-0N
CLR	1	red&black	44	/ALM-RS
P24V	5	black	47	+24VIN
PGND	9	brown&black	1	SG

Leadshine Servo Drive Wiring Diagram

			shielded wire		DB26	3-pin (m
Signal	Pin	Line			Signal	Pin
XP+	7	red&black	11	+)	3	PUL+
XP-	3	green	+ 1	+ 1	4	PUL-
XD+	8	green&black	1		5	DIR+
XD-	4	brown			6	DIR-
ALM	2	orange orange&black	<u> </u>		12	ALM+
SON	6		1 - 1		1	ENA+
CLR	1	red&black	1 1	1 1		
P24V	5	black	1 1	1 1		
PGND	9	brown&black	11	11	9/18/26	SGND
			*		13	ALM-
					2	ENA-

Leadshine Servo Series Basic Parameter					
Parameter Type	Recommended	Setting range			
	Value				

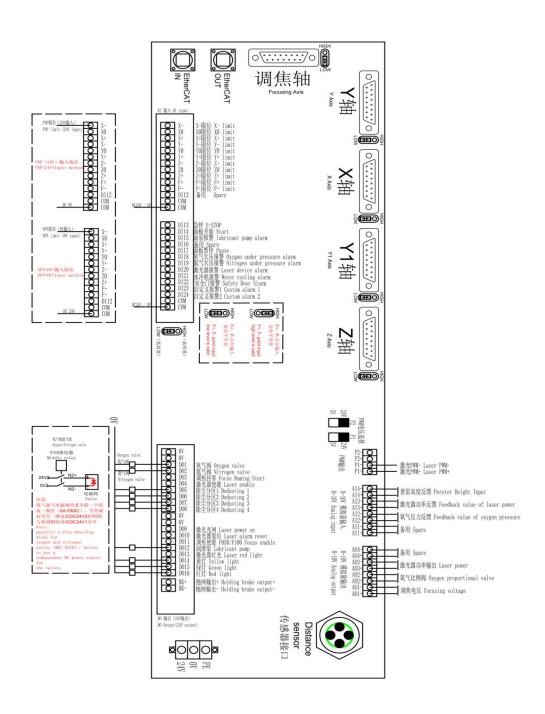


P0-01	0	0position 1Speed 2torque 3position <=>
		<pre>speed 4Position<=>Torque5Speed<=> Torque</pre>
P0-07	3	3: Pulse + Direction
P0-12	1	Encoder feedback reversal

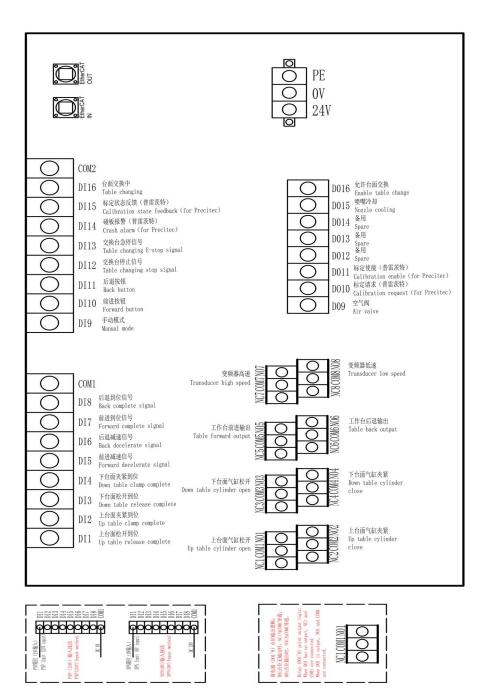
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7.2 EDS3000 Wiring Diagram



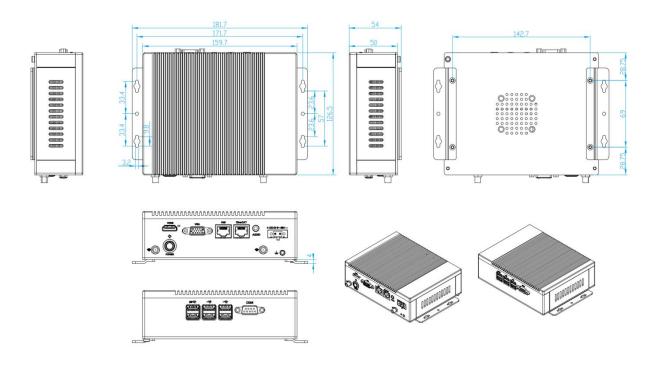
7.3 EDS2010 Wiring Diagram



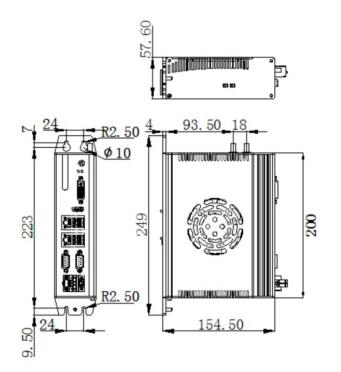
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7.4 EPC-2000 Size Diagram



7.5 EPC-1020 Size Diagram



7.6 Parameter Definition

7.6.1 XY mechanical parameter and hardware config

X, Y-axis mechanical parameters			
Parameter Name	Default Value	Remarks	
Encoder pulse number	10000	How many pulses are sent to the servo and the motor turns one revolution	
Motor direction	Positive	Motor rotation direction is CW or CCW; when the shaft moves in the wrong direction, you can change this option	
Pitch	36	The actual distance the shaft moves when the motor turns one revolution	
Backlash compensation	0	For compensating the backlash of the gearbox	
Max speed	60	Limit the maximum speed of the machine. When the command speed is greater than this speed, this speed is more accurate. The maximum speed and pitch of the motor are generally used to calculate the maximum speed	
Max following offset	60	When the absolute value of the difference between the commanded position and the actual position is greater than this value, the software will alarm for stopping operating	
Max acceleration	6000	The maximum value of acceleration, if any acceleration value is greater than this value, then this value shall prevail	
Sync X parameters to Y	Unchecked	Synchronize X-axis mechanical parameters to Y-axis mechanical parameters	
Sync Y parameters to X	Unchecked	Synchronize Y-axis mechanical parameters to X-axis mechanical parameters	



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Separate set	Selected	X-axis mechanical parameters and Y-axis mechanical parameters are not synchronized, set separately	
Positive hard limit signal	DI3/D16	Positive and hard limit pins can be set	
	NO	NO: no output for limit in untriggered state, select this item NC: output NC: output for limit in untriggered state, select this item	
Zero signal	DI2/D15	Settable zero pins	
	NO	NO: no output for limit in untriggered state, select this item	
		NC: output for limit in untriggered state, select this item	
Negative hard limit	DI2/D14	Negative hard limit pins can be set	
signal	NO	NO: no output for limit in untriggered state, select this item	
		NC: output for limit in untriggered state, select this item	
Servo axis		Fill in according to the actual configuration	
Soft limit range	0~ 1500	Range of X-axis movement of the cutting head after the	
		software returns to zero	
All limits NO	Unchecked	X-axis and Y-axis limit signals are all NO	
All limits NC	Unchecked	All X-axis and Y-axis limit signals are NC	
Separate set	Selected	X-axis and Y-axis limit signals are set separately	

Dual-drive parameters		
Parameter Name	Default Remarks Value	
Slave axis Y1 port	axis	Select axis and fill in according to the actual configuration
Master-Slave Axes SYNC Dir	Reverse	Y1 axis motor rotation direction
Max offset in Master-slave SYNC	10mm	When the absolute value of the difference between the commanded position and the actual position is greater than this value, the software will alarm and shut down.
Duration	0 ms	Alarm for continuously reaching the set time exists exceeds the maximum tolerance error
Master slave stop state error	1mm	In static conditions, if the absolute value of the difference between the commanded position and the actual position is greater than this value, the software will alarm and shut down.

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7.6.2 Pitch

Pitch parameters			
Parameter Name	Default Value	Remarks	
Open Pitch Compensation		Enable and disable the pitch compensation function for the corresponding axis	
Reverse Offset	None	Interferometer parameters are inverted, and the error is inverted for actual conditions	

7.6.3 X/Y Back origin parameter

X/Y-axis Back origin parameters			
Parameter Name	Default	Remarks	
	Value		
Return origin mode	Absolute	Incremental: find the zero signal back to zero and use the zero signal as a reference point Absolute: move to the zero position of the driver feedback,	
		the Position 0 of the drive feedback is the reference point	
Return origin direction an	dNegative	Positive: When returning to zero, move in the positive	
type	direction,	direction	
	zero	Negative: When returning to zero, move zero in the negative	
position		direction:	
		Zero position: Use zero as the reference point to return to zero	
		Limit: determined according to the return to zero	
		direction, if the positive direction is selected, the positive limit	
		is reference point back to zero; if negative direction is	
		selected, the negative limit will be used as the reference point	

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		to return to zero
Return origin speed	1.8	Speed of finding the reference signal when returning to zero
Back distance	0	Distance from zero return to limit signal setback
Aft back set coordinate	0	Coordinate value of the reference switch in the coordinate system
Absolute zero offset	0	Use the current point as the zero point; commissioning without limit switches You can use it for temporary debugging when

7.6.4 Z-Axis follow parameter

Z-axis follow parameters		
Parameter Name	Default	Remarks
	Value	
Pulse number	10000	How many pulses to send to the servo, the motor turns one revolution
Motor direction	Positive	The motor rotation direction is CW or CCW; when the shaft moves in
		the wrong direction, it can change this option
Pitch	10	The actual distance the shaft moves when the motor turns one
		revolution
Speed unit of drive	pulse/s	Selectable pulse/s, 0.1RPM, RPM
Speed loop	0.01	Default is fine
feedforward		
coefficient		
Max follow-up offset	30	When the absolute value of the difference between the
		commanded position and the actual position is greater than this
		value, the software will alarm and shut down.
Homing mode	Incremental	Incremental: Find the zero signal back to zero and use the zero
		signal as a reference point

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	Absolute: Move to the zero position of the drive feedback, wit		
		position 0 of the drive feedback as the reference	
		point	
Return origin direction	Positive	Positive: When returning to zero, move in the positive direction to	
and type		find the return to zero, refer to the switch	
		Reverse: When returning to zero, move in the negative direction to	
		find the return to zero, refer to the switch	
Return to home signal	Limit	Limit: Use the limit as a return to zero reference switch Zero position: use zero position as a return to zero reference	
		switch	
Return origin speed	0.9	Speed of finding the reference signal when returning to zero	
Back distance	5	Distance from zero return to limit signal setback	
Coordinate aft	0	Coordinate value of the reference switch in the coordinate system	
backward set as			
Origin point offset	0	Use the current point as the zero point; for temporary debugging	
compensation		when commissioning without limit switches	
Servo axis	axis	Fill in according to the actual configuration	
Positive hard limit	DI9	Positive and hard limit pins can be set	
signal	NO	NO: no output for limit in untriggered state, select this item	
		NC: output for limit in untriggered state, select this item	
Negative hard limit	DI7	Negative hard limit pins can be set	
signal	NO	NO: no output for limit in untriggered state, select this item	
		NC: output for limit in untriggered state, select this item	
Soft limit range	- 100~2	Range of Z-axis movement of the cutting head after the software	
		returns to zero	
Back output	DI6	Settable holding brake output pins	

7.6.5 Verticality correction

Verticality correction parameters			
Parameter Name	Default Value	Remarks	
Start verticality correcting	Unchecked	Turn on and off the verticality correction function	
Length AB	100mm	Verticality correction function tests the length of one side of a cut rectangle	
Length AC	100mm	Perpendicularity correction function tests the length of the other side of the cut rectangle	
Length L1	141.4mm	The length of one diagonal of the actual cut rectangle, which needs to be measured. After that, fill in that length here	
Length L2	141.4mm	The length of the other diagonal of the rectangle after the actual cutting, which needs to be measured. After measuring, fill in that length here	

7.6.6 Laser head

Laser head				
Parameter Name	Default Value	Remarks		
Brand	RAYTOOLS	Select the cutting head brand		
Model	BT210/240	Select the cutting head model		
Focus control mode	Manual Focusing	Choose according to the type of focus supported by the cutting		

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		head	
Height sensor type	EDS On-Board Capacitive	Select by actual heightening	
	Sensors	equipment	
Height sensor signal port	Not used	Choose by actual configuration	

7.6.7 Laser Device

Laser Device parameters			
Parameter Name	Default Value	Remarks	
Laser Shutter	DO9	Pin selection according to actual wiring	
Laser Red Light	DO13	Pin selection according to actual wiring	
Laser Enable	DO4	Pin selection according to actual wiring	
Laser Reset	DO10	Pin selection according to actual wiring	
Shutter and Red light are mutually exclusive.	unchecked	When checked, the red light button and the light gate button are mutually exclusive and cannot be turned on at the same time	
Laser power	AO3	Pin selection according to actual wiring	
All outputs of PWM	Check	Just check the default box	
Laser Alarm	Not in use, NO	Settable laser alarm pins Alarm signal can be selected as NO or NC	
Chiller Alarm	Not in use, NO	Chiller alarm pins can be set Alarm signal can be selected as NO or NC	
Safety door alarm	Not in use, NO	Settable safety door alarm pins Alarm signal can be selected as NO or NC	

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Safety door alarm stop	Unchecked	When checked, processing will be stopped when the
processing		safety gate alarm is activated during processing
Laser brand	IPG	Just choose by the actual laser brand
Laser power	1000	Average power of the filled laser
Frequency	5000	Fill in the laser frequency, commonly 5000Hz
Voltage of max power	10	Fill in the maximum value of the laser feedback power
		analog, commonly 5V and 10V
Feedback voltage of max	10	Fill in the maximum value of the laser feedback power
power		analog, common 5V and 10V
		Output delay 0 are filled in advance.
Analog output delay	0	The analog output is filled in advance and then output
		enable signal and PWM signal, generally for 50ms
FlyCut laser on delay	0	How many ms in advance of the flying cut? This
		parameter is usually filled in 0, and it is recommended
		to use the advance distance in the nesting to adjust
		whether the flying cut contour is closed or not.
FlyCut laser off delay	0	How many ms of flying cut lag to turn off the light? This
		parameter is usually filled in 0, and it is recommended to
		use the advance distance in the nesting to adjust
		whether the flying cutting contour is closed or not.

7.6.8 Assist gas cell valve and analog output settings

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Assist gas setting parameters			
Parameter Name	Default Value	Remarks	
Air Magnetic Valve	DO9	Settable air magnetic pin	
Air Proportional Valve Power	Not used	Settable air proportional valve power pin	
Air Max Pressure	10	Max pressure supported by the air proportional valve, e.g., if using 0-10BAR proportional valve, this value could be 10.	
Air Proportional Valve Analog	Not used	Settable proportional analog pins	
Oxygen Magnetic Valve	DO1	Settable oxygen solenoid pin	
Oxygen Proportional Valve Power	Not used	Settable oxygen proportional valve power pin	
Oxygen Max Pressure	10	Max pressure supported by the air proportional valve, e.g., if using 0-10BAR proportional valve, this value could be 10.	
Oxygen Proportional Valve Analog	AO2	Settable proportional valve analog pin	
Nitrogen Magnetic Valve	DO2	Settable nitrogen magnetic Valve pin	
Nitrogen proportional cell valve	Not used	Settable nitrogen proportional cell valve pin	
Nitrogen Max Pressure	30	Max pressure supported by the nitrogen proportional valve, e.g., if using 0-30BAR proportional valve, the value can be 30.	
Nitrogen Proportional Valve Analog	Not used	Settable nitrogen proportional valve analog pin	
Main Magnetic Valve	Not used	Settable main magnetic valve	

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Close the power supply of all	Unchecked	When checked, all proportional valve power is	
proportion valves after the		turned off after the processing program is rushed.	
procedure.			
Enable cutting head air	Unchecked	When checked, blowing is turned on when the light	
cooling		comes out and off when the light stops.	
	Not used	Cutting head air cooling solenoid valve port setting	
Air digital gas pressure alarm	Not used	Settable air digital gas pressure alarm input pin	
Oxygen digital gas pressure	DI18	Settable oxygen digital gas pressure alarm input pin	
alarm			
Nitrogen digital gas pressure	DI19	Settable nitrogen digital gas pressure alarm input pin	
alarm			
Air digital gas pressure alarm	NO	NO: No signal output in untriggered, select this item	
logic		NC: signal output in untriggered, select this item	
Oxygen digital gas pressure	NO	NO: No signal output in untriggered, select this item	
alarm logic		NC: signal output in untriggered, select this item	
Nitrogen digital gas pressure	NO	NO: No signal output in untriggered, select this item	
alarm logic		NC: signal output in untriggered, select this item	
Air analog gas pressure	Not used	Settable air analog gas pressure feedback pin	
feedback			
Oxygen analog gas pressure	Not used	Settable oxygen analog gas pressure feedback pin	
feedback			
Nitrogen analog gas pressure	Not used	Settable nitrogen analog gas pressure feedback pin	
feedback			
Suspend processing when gas	Opening	Stopping processing for gas pressure alarm	
pressure alarm on			

7.6.9 Dust removal valve

Dust removal valve parameters		
Parameter Name	Default Value	Remarks
Enable partition output	checked	Whether to open the dust removal function
Row & Col	4/1	Number of rows and columns of partitioned dusting arrays
Dust removal axis	DO5-DO8	Which axis coordinate is used to open the dust cylinder?
Overlayed area length (XY)	20/20	Common zone with the next dusting area, in which this dusting and the next dusting point will be turned on at the same time to ensure the dusting effect
Close output port delay	checked	After leaving the dusting area, the dusting output is closed with a delay to avoid frequent opening and closing of the dusting solenoid valve when the shaft is moving at the boundary of the area.
Only open output in cutting	checked	When checked, the dust removal points are only output when the light is out
Custom removal length	1500*3000	Distance to set up dust removal length

7.6.10 Alarms

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	Alarms parameters
Parameter Name	Remarks
ID	Corresponds to custom alarms number 1, 2, 3
Alarm info (CNS)	In Chinese language, this message will be printed after the alarm
Alarm info (EN)	In English language, this message will be printed after the alarm
Logic	Select whether the alarm signal is NO or NC, according to the actual choice
Process allow	When checked, allow processing when an alarm occurs When unchecked, not allow processing when an alarm occurs
Node Configuration	Settable custom alarm input pin
All NO	After clicking, all custom alarms have become NO
AllNC	After clicking, all custom alarms have become NC
All allow	After clicking, allow processing when custom alarm occurs
All deny	After clicking, not allow processing when custom alarm occurs

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7.6.11 Button

	Button
Parameter Name	Remarks
Number index	Corresponds to custom buttons number 1, 2, 3
Used	When checked, the HMI interface will display this button
Cmd ID	Default
Name (CNS)	Button (Chinese)
Name (EN)	Button (English)
Signal type	Set the alarm signal as hold or trigger type
Node configuration	Settable custom button output pin
Enable all	After clicking, all custom buttons are enabled
Disable all	After clicking, all custom buttons are disabled
All Hold-type	After clicking, all custom buttons are now in the holding-type
All Triggered-type	After clicking, all custom buttons are in triggered-type

7.6.12 Physical button

Physical button		
Parameter Name	Default Value	Remarks
Start signal logic	DI14 NO	Settable start signal input pins NO: No signal output in untriggered, select this item. NC: signal output in untriggered, select this item.
Pause signal logic	DI17 NO	Settable pause signal input pins NO: No signal output in untriggered, select this item. NC: signal output in untriggered, select this item.
Reset signal logic	Not use NO	Settable reset signal input pinsNO: No signal output in untriggered, select this item.NC: signal output in untriggered, select this item.
Emergency stop alarm logic	DI13 NO	Settable emergency stopping alarm signal input pins NO: No signal output in untriggered, select this item. NC: signal output in untriggered, select this item.
Red light	DO13	Red light of tricolor lamp
Yellow light	DO14	Yellow light of tricolor lamp
Green light	DO15	Green light of tricolor lamp

7.6.13 Pallet changer

Input Signal parameters		
Parameter Name	Default Value	Remarks
Start pallet changer	Unchecked	When checked, the pallet changer is started.
Туре	Horizontal	Optional horizontal translation, hydraulic lift, motor
	panning	lift, servo axis exchange, Y-axis pulling, external
		exchange table Selection based on actual pallet
		changer.
Emergency stop	Not used	Settable emergency stopping alarm signal input pin
	NC	pallet changer emergency stop signal
Stop	Not used	Settable stopping alarm signal input pins
	NC	pallet changer stop signal
Forward in-pos	Not used	Settable input pins for sense signals.
	NC	Select sense signal of the pallet changer according
Backward in-pos	Not used	to the actual configuration
Dackward in pos	NC	
Forward deceleration	Not used	
	NC	
Backward deceleration	Not used	
	NC	

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Up-row unclamped in-pos login	Not used	Settable top-row loose-in-place input pin	
	NC	The output logic of the upper table fixed cylinder	
		opening in place sensor	
Up-row clamped in-pos login	Not used	Settable top row clamping in place input pins	
	NC	The output logic of the upper table fixed cylinder	
		clamping in place sensor	
Lower-row unclamped in-pos	Not used	Settable lower row release in place input pins	
login	NC	output logic of the lower table fixed cylinder	
		opening in place sensor	
Lower row clamped in-pos login	Not used	Settable lower row clamping in place input pins	
	NC	The output logic of the lower table fixed cylinder	
		clamping in place sensor	
Cylinder unclamped in-pos signal	Not used	Settable cylinder release in place pin	
	None	Fill in the actual configuration; if you choose	
		none, after the signal output, it will wait for the	
		time to fill in (wait for the cylinder to open	
		completely), and then move the pallet changer.	
Cylinder clamped in-pos signal	Not used	Fill in according to the actual configuration	
	None		
Dual pallet use one cylinder	Close	Settable ON or OFF	
Jog/Auto mode switch	Use IO	Use IO: use external signal to switch between	
		manual and automatic modes	
		Use HMI: use the software interface to switch	
		between manual and automatic modes	
Paller changer with bolt	No	Fill in according to the actual configuration	

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Output Signal parameters		
Parameter Name	Default Value	Remarks
Forward	Not used	Settable forward signal output pin
Backward	Not used	Settable backward signal output pin
High speed	Not used	Settable High speed signal output pin
Low speed	Not used	Settable low speed signal output pin
Up-pallet cylinder unclamped	Not used	Settable up-pallet cylinder unclamped output pin
Up-pallet cylinder clamped	Not used	Settable up-pallet cylinder clamped output pin
Low-pallet cylinder unclamped	Not used	Settable low-pallet cylinder unclamped output pin
Low-pallet cylinder clamped	Not used	Settable low-pallet cylinder clamped output pin

Hardware Button



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Parameter Name	Default Value	Remarks
Forward	Not used,	Settable forward button input pin
	NC	Fill in the actual configuration, if there is no this
		button, please select NO
Backward	Not used,	Settable backward button input pins
	NC	Fill in the actual configuration, if there is no this
		button, please select NO
OneKey exchange	Not used,	Settable oneKey exchange input pin
	NC	Fill in the actual configuration, if there is no this
		button, please select NO
Ascent	Not used,	Settable ascent button input pin
	NC	Fill in the actual configuration, if there is no this
		button, please select NO
Descent	Not used,	Settable descent input pin
	NC	Fill in the actual configuration, if there is no this
		button, please select NO
Jog/Auto mode switch	Enable hardware	Optional IO or HMI
	signals	

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	Parallel	exchange
Parameter Name	Default Value	Remarks
Pallet changer with bolt	No	Fill in according to the actual configuration
Bolt unclamped in-pos	No	Fill in according to the actual configuration,
		Settable delay time
Bolt clamped in-pos	None	Fill in according to the actual configuration
Up-bolt unclamped in-pos logic	Not used,	Settable up-bolt unclamped in-pos input pin
	NC	Up-bolt unclamped in-pos sensor logic.
		If this signal is available, just select it according to
		the actual configuration;
		If this signal is not available, select NO.
Up-bolt clamped in-pos logic	Not used,	Settable up-bolt clamped in-pos input pin
	NC	Up-bolt clamped in-pos sensor logic.
Low-bolt unclamped in-pos logic	Not used,	Settable low-bolt unclamped in-pos input pin
	NC	Low-bolt unclamped in-pos sensor logic.
Low-bolt clamped in-pos logic	Not used,	Settable low -bolt clamped in-pos input pin
	NC	Low-bolt clamped in-pos sensor logic.
Up-pallet bolt unclamped	Not used	Settable up-pallet bolt unclamped output pin
Up-pallet bolt clamped	Not used	Settable up-pallet bolt clamped output pin
Lowpallet bolt unclamped	Not used	Settable low-pallet bolt unclamped output pin
Lowpallet bolt clamped	Not used	Settable low-pallet bolt clamped output pin
Z-axis up-pallet negative	0	When the up-pallet is in the cutting area, the
soft limit		Z-axis moves to this coordinate at the lowest



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Z-axis middle limit logic	Not used,	When the upper table is in the cutting area, Z-axis
	NC	hardware limit logic (different from Z- limit; it can
		be considered that Z-limit is the negative limit of the
		lower table and this limit is the negative limit of the
		upper table) can be set in hard limit input pins
Forward in-pos signal reached	Up-pallet	Fill in the actual configuration, it will determine
pallet		which table is currently in the cutting area, based on
		this parameter.
Cylinder only output after the	Unchecked	Check the box according to the actual
pallet is in place.		situation

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7.6.14 Lubrication

Parameter Name	Remarks
Interval	Output interval of lubrication pump
Duration	Duration of each output of the lubrication pump
Pump overpressure alarm Low oil alarm	Settable alarm input pin and logic for oil pump alarm points
Oil pump output	Settable oil pump output pin

7.6.15 Segmented axis parameters

Servo parameters		
Parameter Name	Default Value	Remarks
Motor direction	Negative	The motor rotation direction is CW or CCW; when the shaft moves in the wrong direction, this option can be changed.
Speed unit of drive	pulse/s	Selectable pulse/s, 0.1RPM, RPM
Speed loop feedforward coefficient	0.01	Default

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Max follow-up offset	5mm	When the absolute value of the difference between the
		commanded position and the actual position is greater than
		this value, the software will alarm and shut down.
System Latency	5	Axis motion delay time
Manual slow	0. 12m/min	Running slowly in manual mode
Manual fast	0.24m/min	Run fast in manual mode
Speed	1.8m/min	Running speed in automatic mode
Acceleration	2000mm/s	Running acceleration in automatic mode
Acc time	500	Time to run acceleration completion in automatic mode
Motor polarity	1	Under torque control, changing the motor polarity can
		change the direction of motion
Max torque	200	Max torque value
Torque feedforward	0	Default
Adjmt. coefficient		
Homing mode	Absolute	Incremental: Find the zero signal back to zero and use the
		zero signal as the reference point
		Absolute: Move to the zero position of the driver feedback with the
		position 0 of the driver feedback as the reference point

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Return origin	Positive,	Positive: When returning origin, move in the positive direction to
direction and type	Limit	find the return to zero reference switch.
		Reverse: When returning origin, move in the negative direction to
		find the return to zero reference switch
		Limit: Use the limit as the return origin reference switch
		Zero position: Use zero position as the return origin reference
		switch
Return origin speed	0.12m/min	Speed of finding the reference signal when returning origin
Back distance	5 mm	Distance from zero return to limit signal setback
Coordinates aft	0	Coordinate value of the reference switch in the coordinate
backward set as		system
Origin point offset	0 mm	The current point as the zero point; commissioning without
compensation		limit switches for temporary commissioning
Servo axis	Not used	Fill in according to the actual configuration
Positive limit signal		Settable positive hard limit pin
		NO: no output in the untriggered state, select this item
		NC: output in untriggered state, select this item
Soft limit	Open	Settable negative hard limit pin
		NO: no output in the untriggered state, select this item
		NC: output in untriggered state, select this item
Soft limit range	-10~10mm	The range of axis movement after the software returns origin
Axis taq		Current axis for labeling, detailed information notes

7.6.16 Advanced option

	Advanced option parameters		
Parameter	Default	Remarks	
Name	Value		
DX150P position loop mode (HMI version greater than 5609)	Unchecked	You can choose whether or not to search for edges before processing in the software interface after checking the box.	
Enable NozzleClean	Unchecked	The software supports nozzle cleaning after checking the box.	
Enable Nest	Checked	Supporting nesting function after checking the box.	
Docking points follows selected shape	Unchecked	The docking point changes with the selected drawing; unchecked, the docking point is planned according to the entire drawing, after checking the box.	
Fix point motion speed is manual fast (default speed: G00)	Unchecked	The interface uses manual speed for all fast-positioning movements after checking the box; unchecked for duty speed.	
Enable servo gantry axis control	Unchecked	Checking special parts supports part of the support gantry drive available; not recommended to arbitrarily check the box, and if you have such requirements, please contact our after-sales professionals.	
Display maintenance module	Unchecked	Support the maintenance function after checking the box.	



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